EPA/ROD/R03-88/040
1988

# EPA Superfund
# Record of Decision:

**L.A. CLARKE & SON**
**EPA ID: VAD007972482**
**OU 01**
**SPOTSYLVANIA, VA**
**03/31/1988**

- SURFACE TOPOGRAPHY IS RELATIVELY FLAT DUE TO EXTENSIVE FILL AND GRADING OPERATIONS.

- THE SITE IS UNDERLAIN BY 0 TO 26 FEET OF ALLUVIAL GRAVELLY SANDS ON TOP OF A 13- TO 32-FOOT THICK SILTY CLAY/CLAYEY SILT UNIT. THE ALLUVIUM PINCHES OUT ALONG THE SOUTHERN MARGIN OF THE SITE, EXPOSING THE UNDERLYING CLAYEY SILT.

- A SHALLOW WATER TABLE AQUIFER FLOWS TO THE SOUTHEAST WITHIN THE ALLUVIAL DEPOSITS, AND CONTINUES, WHERE THE ALLUVIUM PINCHES OUT, INTO THE ADJACENT FRACTURED SILTY CLAY/CLAYEY SILT. A DEEPER AQUIFER UNDERLIES THIS UNIT.

- FREE PRODUCT CREOSOTE IS VISIBLE ON THE ALLUVIUM-CLAY INTERFACE IN NONPRODUCTION/DISPOSAL AREAS INDICATING THAT MIGRATION OF CREOSOTE IS, IN PART, CONTROLLED BY THE UNDULATORY NATURE OF THE CLAY SURFACE.

- CREOSOTE IS PRESENT 5 OR MORE FEET BELOW THE SURFACE OF THE CLAYEY SILT/SILTY CLAY BOTH NEXT TO THE FACILITY AND ALONG THE SOUTHERN SITE BOUNDARY. THE CREOSOTE APPEARS IN SANDY INTERBEDS AND ALONG MICROFRACTURES IN THE CLAYEY SILT/SILTY CLAY.

- ON-SITE SOILS AND FILL ARE PERMEABLE, WHICH REDUCES SURFACE RUNOFF. DITCHES THAT DRAIN THE SITE MAINTAIN FLOW THROUGHOUT THE YEAR AND ARE, IN FACT, SURFACE MANIFESTATIONS OF A SHALLOW WATER TABLE SYSTEM. THE HIGH CREOSOTE LEVELS IN SOILS AT THE DITCH OUTFALLS (IN THE WETLANDS ADJACENT TO MASSAPONAX CREEK) INDICATE THAT THE DITCHES ARE A PRIMARY MECHANISM FOR OFF-SITE TRANSPORT.

IN ALL CASES, THE PRIMARY CONTAMINANTS OF CONCERN ARE CONSTITUENTS OF CREOSOTE, PARTICULARLY POLYNUCLEAR AROMATICS (PNAS) AND BENZENE. BASED ON CHEMICAL ANALYSES OF SURFACE AND SUB-SURFACE SOILS, PLANT PRACTICES HAVE APPARENTLY CREATED THE FOLLOWING CONTAMINANT SOURCE AREAS (SEE SELECTED SOIL AND SEDIMENT SAMPLE RESULTS AND FIGURES 4-9, 4-11 AND 4-12):

- BURIAL OF WASTE CREOSOTE IN PITS HAS RESULTED IN RELATIVELY STATIONARY POCKETS OF ELEVATED PNA CONCENTRATIONS AND A SOURCE OF SOLUBLE CONTAMINATION, WHICH IS TRANSPORTED BY INFILTRATION TO THE GROUNDWATER. (SEE RESULTS FOR TP-06, TP-33 AND TR-4.).

- PLANT OPERATIONS HAVE INCLUDED YEARS OF SPILLS AND LEAKS AT THE TREATMENT CYLINDERS. FREE PRODUCT IN THESE AREAS HAS COMPLETELY PERMEATED SUBSURFACE SOILS DOWN TO THE CLAY STRATUM. HORIZONTAL MIGRATION OF FREE PRODUCT ALONG THE TOP OF THIS STRATUM IS EVIDENT, FORMING A "CREOSOTE LAYER" (SEE RESULT FOR TB-12).

- SAMPLE RESULTS ALSO INDICATE SUBSTANTIAL CONTAMINATION OF SURFACE SEDIMENTS IN ON-SITE DRAINAGE DITCHES, PARTICULARLY 001 AND 002, AND AT THE OUTFALLS OF THESE DITCHES (SEE RESULTS FOR D11 AND D12). A SIGNIFICANT QUANTITY OF SUB-SURFACE SEDIMENT HAS BEEN DETECTED AT THE OUTFALL OF DITCH 001 (SEE VC-01).

- AREAS OF RELATIVELY HIGHER PNA CONCENTRATIONS IN SURFACE SOIL INCLUDE AREAS AROUND THE PROCESS FACILITY, THE FIELD SOUTHEAST OF THE LAGOON, AND THE WETLANDS NEAR THE OUTFALLS. SURFACE SOILS IN THE PROCESS AREA BECOME INCREASINGLY STAINED APPROACHING THE OPERATIONS BUILDINGS DUE TO THE FREQUENT TRANSPORT IN THAT AREA OF FRESHLY TREATED LUMBER. SURFACE SOILS IN THIS AREA CONTAIN TOTAL PNA CONCENTRATIONS ON THE ORDER OF 5,000 MG/KG. SURFACE SOILS IN THE WETLANDS ARE HEAVILY STAINED WITHIN 100 FEET OF THE OUTFALLS.

- PNA CONCENTRATIONS IN EXCESS OF 5,000 MG/KG CAN BE FOUND IN SURFACE SOILS IN THE AREA SOUTHEAST OF THE WASTEWATER LAGOON. THIS CAN BE ATTRIBUTED TO THE SPRAYING OF WASTEWATER FROM THE LAGOON WHEN

IN SERVICE AND THE USE OF AN EARTHEN OVERFLOW PIT, SHOWN ON HISTORICAL OVERFLIGHTS, DIRECTLY SOUTH OF THE LAGOON.

- A SOIL PILE, LOCATED WEST OF THE WASTEWATER LAGOON, CONSISTS OF CONTAMINATED SOILS EXCAVATED BY L. A. CLARKE FROM AREAS SURROUNDING THE PROCESS FACILITY. SOIL SAMPLES TAKEN FROM THE PILE BY PREVIOUS INVESTIGATORS (SCHNABEL ENGINEERING ASSOCIATES) INDICATE THE PRESENCE OF PNAS IN EXCESS OF 1,000 MG/KG AND LOW LEVELS OF BENZENE. IN ADDITION, THE RCRA REGULATED LAGOON HAS BEEN ESTIMATED TO HOLD 278 CUBIC YARDS OF CREOSOTE BOTTOM SEDIMENT.

CHEMICAL ANALYSES HAVE REVEALED THE FOLLOWING ABOUT CONTAMINANT MIGRATION PATHWAYS:

- SIGNIFICANT CONTAMINANT LEVELS HAVE BEEN DETECTED IN WETLANDS TRIBUTARIES RECEIVING DRAINAGE FROM THE SITE (SEE RESULTS FOR MO2). MASSAPONAX CREEK SEDIMENTS DOWNSTREAM OF THE SITE RANGED FROM BELOW DETECTION TO 12 MG/KG OF PNA (DETECTED BY U.S. FISH AND WILDLIFE SERVICE).

- A SURVEY OF BOTTOM FEEDING FISH FROM WESTVACO POND REVEALED CARCINOGENIC LESIONS AROUND THE GILLS AND MOUTH IN SEVERAL SPECIMENS. THESE ABNORMALITIES MAY BE DUE TO DIRECT CONTACT WITH CREOSOTE CONTAMINATED SEDIMENTS. SEDIMENT SAMPLES TAKEN FROM THE EDGE OF THE POND CONTAINED TOTAL PNA CONCENTRATIONS BETWEEN 2 AND 18 MG/KG. AREAS OF BLACKENED SOILS AND SEDIMENTS HAVE BEEN OBSERVED AT THE WATER'S EDGE.

- TOTAL PNA CONCENTRATIONS IN THE SHALLOW AQUIFER RANGED UP TO 1500 UG/L. BENZENE RANGED UP TO 100 UG/L.

- TOTAL PNA CONCENTRATIONS IN THE DEEP AQUIFER WERE BELOW DETECTION, WITH THE EXCEPTION OF ONE DETECTION OF LESS THAN 10 UG/L. FOLLOWUP SAMPLING OF THE WELL REVEALED NO PNAS. BENZENE WAS NOT DETECTED IN THE DEEP AQUIFER.

SCOPE OF REMEDIAL ACTION

THE OVERALL OBJECTIVES OF THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) WERE TO: (1) GENERATE INFORMATION NEEDED TO EVALUATE ACTUAL AND POTENTIAL RISKS TO RECEPTORS FROM SITE-RELATED CONTAMINATION IN SOIL, SURFACE WATER AND GROUNDWATER AND (2) DEVELOP REMEDIAL ALTERNATIVES TO ELIMINATE UNACCEPTABLE RISK. RI DATA AND THE PUBLIC HEALTH EVALUATION OF THE DATA INDICATED THAT CONTROL OF CONTAMINANT SOURCES AT L.A. CLARKE WOULD ADDRESS THE PRINCIPAL THREAT TO HUMAN HEALTH AND THE ENVIRONMENT. AS A RESULT, THE FS FOCUSED ON THE DEVELOPMENT OF REMEDIAL ALTERNATIVES DESIGNED TO CONTROL CONTAMINANT SOURCES IDENTIFIED DURING THE RI. THE SELECTED ALTERNATIVE IN THIS RECORD OF DECISION (ROD) IS THEREFORE A SOURCE CONTROL REMEDY.

THE RI HAS ALSO GENERATED SIGNIFICANT DATA ON THE MIGRATION OF SITE-RELATED CONTAMINANTS FROM THE IDENTIFIED SOURCES. IN PARTICULAR, THE RI INDICATES SITE RELATED CONTAMINANTS HAVE MIGRATED (1) INTO A SHALLOW AQUIFER LYING BOTH BELOW AND DOWNGRADIENT OF THE PROPERTY OF CONCERN AND (2) INTO SEDIMENTS LOCATED DOWNGRADIENT OF THE SITE. HOWEVER, IN EACH CASE, ADDITIONAL INFORMATION IS NEEDED TO DETERMINE THE EXTENT OF CONTAMINATION BEFORE REMEDIAL ALTERNATIVES CAN BE DEVELOPED AND ONE SELECTED. THEREFORE, THE EPA WILL CONTINUE THE RI/FS TO DEVELOP ALTERNATIVES TO ADDRESS THESE MIGRATION PATHWAYS. (NOTE: THIS ROD DOES INCLUDE REMEDIATION OF SEDIMENTS ALREADY KNOWN TO PRESENT AN UNACCEPTABLE RISK.).

REMEDIAL ACTION OBJECTIVES

UTILIZING DATA GENERATED DURING THE RI, A PUBLIC HEALTH EVALUATION (PHE) WAS CONDUCTED TO HELP DETERMINE THE OBJECTIVE(S) OF CERCLA REMEDIAL ACTION AT THE L.A. CLARKE SITE. THE PRIMARY OBJECTIVE IN THIS CASE IS TO ELIMINATE SOIL AND SEDIMENT CONTAMINATION WHICH PRESENTS AN UNACCEPTABLE RISK TO HUMAN HEALTH AND THE ENVIRONMENT. THE PRIMARY ACTUAL AND POTENTIAL RISK PATHWAYS OF CONCERN IN THIS CASE ARE:

- INCIDENTAL INGESTION/DERMAL CONTACT - CONCENTRATIONS OF SITE-RELATED CONTAMINANTS IN SURFACE SOILS AND SEDIMENTS SHOULD NOT EXCEED CRITERIA PROTECTIVE OF CURRENT WORKERS AND POTENTIAL FUTURE RESIDENTS FOR

INCIDENTAL INGESTION AND DERMAL CONTACT. NO FEDERAL OR STATE STANDARDS EXIST FOR PROTECTION FROM SOIL EXPOSURE VIA THESE DIRECT CONTACT PATHWAYS. THEREFORE, THE CRITERIA IN THIS CASE MUST CORRESPOND TO AN ACCEPTABLE LEVEL OF CARCINOGENIC RISK. SINCE THERE IS ACTUAL EXPOSURE OF WORKERS TO THE SOILS OF CONCERN, A RISK LEVEL OF 10-6 IS DETERMINED TO BE APPROPRIATE IN THIS CASE. TO ACHIEVE A 10-6 RISK LEVEL FOR ON-SITE WORKERS, CARCINOGENIC POLYNUCLEAR AROMATIC (CPNA) CONCENTRATIONS IN SURFACE SOILS SHOULD NOT EXCEED 0.22 MG/KG. TO ACHIEVE THE SAME RISK LEVEL FOR POTENTIAL FUTURE RESIDENTS, SURFACE SOILS SHOULD NOT EXCEED 0.08 MG/KG CPNA.

- INGESTION OF SHALLOW GROUNDWATER - CONCENTRATIONS OF SITE-RELATED CONTAMINANTS IN SUB-SURFACE SOILS (AT OR BELOW AN AVERAGE OF 1.5' FROM GROUND SURFACE) SHOULD NOT EXCEED CRITERIA PROTECTIVE OF THE SHALLOW AQUIFER UNDERLYING THE SITE AS A POTENTIAL DRINKING WATER SUPPLY. AGAIN, THERE ARE NO FEDERAL OR STATE STANDARDS FOR SOILS TO ACHIEVE ADEQUATE PROTECTION FROM EXPOSURE VIA THIS PATHWAY. THEREFORE, THE CRITERIA OF CONCERN IS A CARCINOGENIC RISK LEVEL. BECAUSE (1) THE CLOSEST HOMEWELLS DRAWING FROM THE SHALLOW AQUIFER ARE LOCATED AN ESTIMATED 1000 FEET FROM THE SITE BOUNDARY AND (2) THESE RESIDENTIAL WELLS ARE CURRENTLY EITHER SIDEGRADIENT OR UPGRADIENT OF THE SITE, A 10-5 RISK AT THE SITE BOUNDARY IS A REASONABLE GOAL FOR PROTECTING THESE HOME WELL OWNERS AS WELL AS OTHER CURRENT AND FUTURE USERS OF THE AQUIFER OF CONCERN. IN ADDITION, THIS GOAL IS ACHIEVABLE THROUGH THE USE OF SOIL/SEDIMENT TREATMENT TECHNOLOGIES. TO ACHIEVE THIS GOAL, TARGET CLEAN-UP LEVELS FOR SITE-RELATED CONTAMINATED SOILS HAVE BEEN DEVELOPED (SEE RI/FS ADDENDUM). THE TARGET CLEAN-UP LEVEL FOR CPNA IN SOIL TO ACHIEVE THIS GOAL IS 10.3 MG/KG. FOR BENZENE, THE TARGET CLEAN-UP LEVEL TO ACHIEVE THIS GOAL IS 94.03 UG/KG. THESE TARGET CLEAN-UP LEVELS SHALL BE CONFIRMED VIA STUDIES IN THE REMEDIAL DESIGN PHASE. (NOTE: A REMEDIAL ALTERNATIVES FOR RESTORATION OF GROUNDWATER TO APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) OF CONCERN WILL BE DETERMINED IN A SUBSEQUENT ROD.).

- PROTECTION OF AQUATIC LIFE - CONCENTRATIONS OF SITE-RELATED CONTAMINANTS IN SOILS AND SEDIMENTS SHOULD NOT EXCEED CRITERIA PROTECTIVE OF AQUATIC LIFE IN SURFACE WATER E.G., MASSAPONAX CREEK. THERE ARE NO FEDERAL OR STATE STANDARDS FOR SOILS TO ACHIEVE SUCH PROTECTION. THE PHE HAS DETERMINED, VIA SURFACE WATER MODELING, THAT PREVENTION OF ADVERSE EFFECTS ON AQUATIC LIFE IN SURFACE WATER DUE TO INPUTS FROM SURFACE WATER RUNOFF AND GROUNDWATER INFILTRATION CAN BE ACHIEVED BY REDUCING TPNA (TOTAL POLYNUCLEAR AROMATIC) LEVELS IN SOILS AND SEDIMENTS TO TARGET CLEAN-UP LEVELS OF 352 MG/KG. IF NECESSARY, THIS LEVEL SHALL BE CONFIRMED DURING THE REMEDIAL DESIGN.

THE ABOVE CLEAN-UP CRITERIA FUNCTION AS CHEMICAL SPECIFIC ARARS IN THIS CASE. TO ACHIEVE SURFACE SOIL LEVELS PROTECTIVE OF DIRECT CONTACT EXPOSURE, THE SITE WILL BE COVERED WITH 1.5 FEET OF SEEDED TOPSOIL. TO ACHIEVE PROTECTION OF THE SHALLOW AQUIFER FOR DRINKING WATER PURPOSES, TARGET CLEAN UP LEVELS FOR SOILS LYING UNDER TOPSOIL AFTER THE COMPLETION OF REMEDIATION ARE 10.3 MG/KG CPNA AND 94.03 UG/KG BENZENE. BY MEETING SUCH LEVELS, PROTECTION OF AQUATIC LIFE IN SURFACE WATER SHALL ALSO BE ACHIEVED. TO ESTIMATE THE COST OF THE REMEDIAL ALTERNATIVES, THE VOLUME OF SOIL AND SEDIMENT CURRENTLY EXCEEDING LEVELS PROTECTIVE OF THE SHALLOW AQUIFER HAVE BEEN ESTIMATED. THESE VOLUMES WERE DEVELOPED UTILIZING CONTAMINANT PROFILES LOCATED IN APPENDIX B OF THE RI/FS AND OTHER INFORMATION WITHIN THE RI/FS. CPNA CONCENTRATIONS WERE ESTIMATED USING A CPNA:TPNA RATIO OF 0.13 (SEE RI/FS) I.E., THE CLEANUP LEVEL WAS ASSUMED TO BE ROUGHLY 80 MG/KG TPNA. THE CALCULATED VOLUMES INCLUDE: (1) THE RCRA REGULATED SOIL PILE AND (2) BOTTOM SEDIMENT IN THE RCRA REGULATED LAGOON. IN ADDITION, SEDIMENTS OF WESTVACO POND HAVE BEEN INCLUDED BASED ON THE RESULTS OF AN AQUATIC LIFE SURVEY.

THE ESTIMATED VOLUMES OF SOILS AND SEDIMENTS AT THE SITE REQUIRING REMEDIATION ARE:

| MEDIA | VOLUME (IN YD3) |
|---|---|
| SURFACE SOILS | 60,200 |
| BURIED PITS | 2,500 |

| | |
|---|---|
| CREOSOTE LAYER | 6,000 |
| SEDIMENTS | 45,300 |
| SUBSURFACE WETLAND SOILS | 5,000 |
| TOTAL | 119,000 YD3. |

REMEDIAL ALTERNATIVE EVALUATION

THE FEASIBILITY STUDY FOR THE L.A. CLARKE SITE SCREENED A NUMBER OF ALTERNATIVES WHICH COULD POTENTIALLY ACHIEVE THE REMEDIAL OBJECTIVE OF CONCERN I.E., REDUCE CONTAMINANT LEVELS IN ON-SITE SOILS AND SEDIMENTS TO LEVELS WHICH ELIMINATE UNACCEPTABLE RISK TO HUMAN HEALTH AND THE ENVIRONMENT (SEE REMEDIAL ACTION OBJECTIVES).

ALL ALTERNATIVES WERE EVALUATED VIA THE FOLLOWING CRITERIA:

- PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT
- COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)
- LONG TERM EFFECTIVENESS AND PERMANENCE
- REDUCTION OF WASTE MOBILITY, TOXICITY AND VOLUME
- SHORT TERM EFFECTIVENESS
- IMPLEMENTABILITY
- COMMUNITY ACCEPTANCE
- STATE ACCEPTANCE
- COST.

THESE CRITERIA WERE DERIVED FROM THE NCP AND SARA OF 1986. THE CRITERIA RELATE DIRECTLY TO FACTORS MANDATED IN SECTION 121(B)(1)(A-G). UTILIZING THESE CRITERIA, CERTAIN ALTERNATIVES WERE ELIMINATED DURING THE PRELIMINARY SCREENING PROCESS. THE ELIMINATED ALTERNATIVES AND THE PRIMARY REASON(S) FOR THEIR ELIMINATION ARE LISTED BELOW. (A MORE DETAILED ANALYSIS OF THESE ALTERNATIVES MAY BE FOUND IN THE FS.).

| ALTERNATIVE | REASON(S) FOR ELIMINATION |
|---|---|
| IN-SITU ADSORPTION | EFFECTIVENESS IS QUESTIONABLE DUE TO VISCOSITY OF CREOSOTE. |
| SUPERCRITICAL EXTRACTION | IN EARLY DEVELOPMENT STAGES; APPLICABILITY TO SITE IS QUESTIONABLE. |
| IN-SITU VITRIFICATION | OTHER TECHNOLOGIES CAN ACHIEVE SIMILAR RESULTS AT CONSIDERABLY LESS COST. |
| MACROENCAPSULATION | POSSIBLE LEACHING OF TREATED MATERIALS; RELATIVELY UNRELIABLE. |
| ASPHALT INCORPORATION | LITTLE OPERATING HISTORY; FEW OPERATIONS CAPABLE OF IMPLEMENTATION. |

DESCRIPTION OF ALTERNATIVES

SIX ALTERNATIVES WERE RETAINED FOR THE FINAL EVALUATION. THESE SIX ALTERNATIVES HAVE BEEN FURTHER EVALUATED TO DETERMINE WHICH WOULD BE MOST EFFECTIVE IN ACHIEVING THE GOALS OF CERCLA, AND IN PARTICULAR, ACHIEVING THE REMEDIAL OBJECTIVE FOR THE SITE.

IN THE CASE OF EACH OF THE SIX ALTERNATIVES, COST ESTIMATES HAVE BEEN DEVELOPED. EACH ESTIMATE INCLUDES THE ADDITION OF (1) A 25% CONTINGENCY RATE FOR CAPITAL COSTS AND (2) A 15% CONTINGENCY RATE FOR OPERATION AND MAINTENANCE COSTS. THE ADDITION OF THESE RATES IS TO PREVENT AN UNDERESTIMATION OF THE FINAL COST. ACTUAL FINAL COSTS MAY THEREFORE BE LESS THAN THESE ESTIMATES. BUILDING REMOVAL COSTS OF $1.5 MILLION HAVE BEEN INCLUDED UNDER CAPITAL COSTS WHERE SUCH REMOVAL IS REQUIRED.

ALTERNATIVE 1: NO ACTION

CAPITAL COST: $ 74,000.
PRESENT WORTH OF O&M: $ 507,000.
TOTAL PRESENT WORTH: $ 581,000.

UNDER THE NO ACTION ALTERNATIVE, NO ADDITIONAL REMEDIAL ACTION WILL BE TAKEN AT THE L. A. CLARKE SITE. THE COMPONENTS OF THIS ALTERNATIVE INCLUDE THE FOLLOWING:

- UPGRADE OF SITE SECURITY BY THE INSTALLATION OF FENCING AROUND THE PERIMETER OF THE SITE.

- IMPLEMENTATION OF A LONG-TERM QUARTERLY GROUND/SURFACE WATER MONITORING PROGRAM.

CHEMICAL SPECIFIC ARARS ESTABLISHED FOR THE SITE WOULD NOT BE MET WITH NO ACTION. IN PARTICULAR, PNA AND BENZENE CONCENTRATIONS IN SUB-SURFACE SOILS WOULD CONTINUE TO EXCEED LEVELS WHICH CONSTITUTE A CARCINOGENIC RISK OF GREATER THAN 10-5 FOR POTENTIAL CONSUMERS OF GROUNDWATER FROM THE SHALLOW AQUIFER AT THE SITE BOUNDARY. IN ADDITION, WHILE FENCING THE SITE WOULD TEMPORARILY PREVENT ACCESS BY AREA RESIDENTS, ON-SITE WORKERS WOULD CONTINUE TO BE EXPOSED TO SOIL CONTAMINANT LEVELS WHICH EXCEED A 10-6 RISK FOR DIRECT CONTACT PATHWAYS.

ACTION SPECIFIC ARARS WOULD ALSO NOT BE MET WITH THIS ALTERNATIVE. IN PARTICULAR, (1) APPLICABLE RCRA CLOSURE AND POST-CLOSURE REQUIREMENTS FOR THE WASTE PILE AND SURFACE IMPOUNDMENT WOULD NOT BE MET, (2) RELEVANT AND APPROPRIATE RCRA CLOSURE AND POST CLOSURE REQUIREMENTS FOR THE HAZARDOUS WASTE CONTAMINATED SOILS AND SEDIMENTS LOCATED ELSEWHERE AT THE SITE WOULD NOT BE MET AND (3) APPROPRIATE CORRECTIVE ACTION RCRA REQUIREMENTS FOR RELEASES OF HAZARDOUS WASTES FROM SOLID WASTE MANAGEMENT UNITS WOULD NOT BE MET.

ALTERNATIVE 2: SOIL EXTRACTION

INITIAL CAPITAL COST: $ 2,453,000.
PRESENT WORTH OF IMPLEMENTATION: $ 26,470,000.
PRESENT WORTH OF O&M: $ 33,900.
TOTAL PRESENT WORTH: $ 28,956,900.

THIS ALTERNATIVE CONSISTS OF EXCAVATING ALL SOILS AND SEDIMENTS EXCEEDING TARGET CLEAN-UP LEVELS AND TREATING THESE MATERIALS TO ELIMINATE UNACCEPTABLE RISK AND RETURNING THE TREATED SOILS AND SEDIMENTS TO THEIR ORIGINAL LOCATION. THE SOILS/SEDIMENTS WOULD BE TREATED VIA AN ON-SITE SOIL WASHING/EXTRACTION PROCESS. THIS PROCESS INVOLVES THE WASHING OF CONTAMINATED SOIL WITH A SURFACTANT-TYPE SOLUTION WHICH MOBILIZES CONTAMINANTS PREVIOUSLY ASSOCIATED WITH THE SOIL. THE EXTRACTED CONTAMINANTS MAY THEN BE DISPOSED OF WHILE THE WASHING SOLUTION IS RECYCLED FOR FURTHER USE. TO FULLY IMPLEMENT THIS ALTERNATIVE, BUILDING REMOVAL IS REQUIRED. THE MAJOR COMPONENTS OF THIS REMEDIAL ALTERNATIVE INCLUDE THE FOLLOWING:

- COMPLETE EXCAVATION/DREDGING OF CONTAMINATED MATERIALS INCLUDING SURFACE SOILS, SEDIMENTS IN DITCHES 1, 2, AND 3, THE WETLANDS, WESTVACO POND, BURIED PIT MATERIALS, CREOSOTE LAYER, AND SUB-SURFACE WETLANDS SOILS.

- GEOTEXTILE SILT FENCES, SEDIMENTATION BASINS AND/OR DIVERSION/SURFACE MANAGEMENT TO CONTROL OFF-SITE SOIL TRANSPORT AND DIVERT SURFACE-WATER AND GROUNDWATER FLOWS.

- ORGANIC VAPOR MONITORING.

- DEWATERING OF SEDIMENTS; TREATMENT (IF REQUIRED) AND ON-SITE DISCHARGE OF SEDIMENT WATERS.

- ON-SITE SOIL WASHING/EXTRACTION OF CONTAMINATED MATERIAL USING WATER/CHEMICAL SOLUTIONS IN A TANK.

- ON-SITE TREATMENT OF SOIL WASHING ELUTRIATE STREAM, USING CONVENTIONAL WASTEWATER TREATMENT METHODS.

- ON-SITE DISCHARGE OF TREATED PROCESS WASTEWATER.

- OFF-SITE DISPOSAL OF TREATMENT RESIDUALS.

- BACKFILL AND REGRADE SURFACE AND SUBSURFACE AREAS ONSITE AND IN

THE WETLANDS WITH TREATED SOIL, COVER WITH CLEAN SOIL AND REVEGETATE.

- POST-TREATMENT GROUNDWATER MONITORING.

THIS ALTERNATIVE WOULD MEET CHEMICAL SPECIFIC ARARS BY ELIMINATING SOIL CONTAMINANT LEVELS WHICH PRESENT AN UNACCEPTABLE CARCINOGENIC RISK (SEE REMEDIAL ACTION OBJECTIVES). THE ATTACHED ARAR COMPLIANCE TABLE SUMMARIZES OTHER ARARS WHICH SHOULD BE MET.

ALTERNATIVE 3: IN SITU SOIL FLUSHING/BIORECLAMATION AND SOIL BIODEGRADATION VIA LANDFARMING

INITIAL CAPITAL COST: $ 2,295,000.
PRESENT WORTH OF IMPLEMENTATION: $ 21,080,000.
PRESENT WORTH OF O&M: $ 33,900.
TOTAL PRESENT WORTH: $ 23,408,900.

THIS ALTERNATIVE INCLUDES THE APPLICATION OF TWO DIFFERENT TREATMENT TECHNOLOGIES TO ADDRESS TWO DIFFERENT AREAS OF CONTAMINATED SOIL. CONTAMINATED SOILS UNDER THE PROCESS BUILDINGS WOULD BE REMEDIATED IN SITU VIA SOIL FLUSHING WITH A SURFACTANT SOLUTION FOLLOWED BY IN SITU BIORECLAMATION. A FLUSHING SOLUTION OF APPROPRIATE VISCOSITY WOULD BE APPLIED TO SUB-SURFACE SOILS VIA INJECTION WELLS TO MOBILIZE CREOSOTE ASSOCIATED WITH THESE SOILS. THE SOLUTION AND ASSOCIATED CONTAMINANTS WOULD THEN BE RECOVERED FROM THE SUB-SURFACE SOILS VIA A RECOVERY WELL NETWORK. IN SITU BIORECLAMATION OF THESE SUBSURFACE SOILS WOULD THEN BE IMPLEMENTED TO REDUCE CONTAMINANT CONCENTRATIONS TO TARGET CLEAN-UP LEVELS. BIORECLAMATION WOULD CONSIST OF THE APPLICATION OF A NUTRIENT AND OXYGEN RICH SOLUTION TO PROMOTE THE BIODEGRADATION OF THE CONTAMINANTS VIA BACTERIAL ACTION. THE SOLUTION WOULD BE APPLIED VIA THE SAME INJECTION WELLS USED FOR SURFACTANT SOLUTION APPLICATION.

BOTTOM SEDIMENT FROM THE RCRA REGULATED IMPOUNDMENT WOULD BE BIOLOGICALLY TREATED IN A TANK, WHILE THE RCRA REGULATED SOIL PILE WOULD BE LAND TREATED IN PLACE.

ALL OTHER CONTAMINATED SOILS AND SEDIMENTS AT THE SITE WOULD BE REMEDIATED BY BIODEGRADATION VIA LANDFARMING. THIS TECHNOLOGY CONSISTS OF LAND TREATMENT OF CONTAMINATED MATERIALS EITHER IN-PLACE OR WITHIN AN APPROPRIATELY DESIGNED LANDFARM ON-SITE. LANDFARMING INVOLVES THE INITIATION AND MAINTENANCE OF THE CONDITIONS NECESSARY TO PROMOTE THE BIODEGRADATION OF CONTAMINANTS BY EITHER INDIGENOUS OR SPECIALLY DEVELOPED BACTERIAL POPULATIONS. THESE CONDITIONS ARE CAN BE GENERATED BY CONVENTIONAL FARMING TECHNIQUES SUCH AS TILLING AND NUTRIENT APPLICATION, SUPPLEMENTED BY THE APPLICATION OF OXYGEN-RICH COMPOUNDS.

BOTH SOIL FLUSHING AND BIODEGRADATION WOULD REQUIRE BENCH AND PILOT SCALE STUDIES TO DEVELOP THE SPECIFIC DESIGNS APPROPRIATE TO CONDITIONS AT THE SITE. THE DESIGNS WOULD ALSO MINIMIZE RELEASES TO AIR, SURFACE WATER AND THE SUB-SURFACE BY MEETING THE ARARS OF CONCERN. THESE STUDIES WOULD BE CONDUCTED AS PART OF THE REMEDIAL DESIGN PHASE OF THE PROJECT.

ALL CHEMICAL SPECIFIC ARAR'S IDENTIFIED UNDER REMEDIAL ACTION OBJECTIVES WOULD BE MET WITH THIS ALTERNATIVE. THE ATTACHED ARAR COMPLIANCE TABLE SUMMARIZES OTHER ARAR'S WHICH WOULD BE MET.

THE MAJOR COMPONENTS OF THIS ALTERNATIVE INCLUDE THE FOLLOWING:

- IN SITU SOIL FLUSHING, UTILIZING A SURFACTANT SOLUTION, OF SUBSURFACE SOILS (CREOSOTE LAYER) UNDERLYING THE PROCESS BUILDINGS:

  - INJECTION/RECOVERY WELLS TO DIRECT WASHING SOLUTIONS TO THE CONTAMINATED SOILS AND THEN RECOVER THE CONTAMINANT-LADEN WASH SOLUTION.

  - DESIGN AND USE OF A WELL SYSTEM TO ATTAIN A SELF-CONTAINED FLUSHING SCHEME TO PREVENT ENVIRONMENTAL IMPACTS.

  - A WASTEWATER TREATMENT SYSTEM TO REMOVE CONTAMINANTS FROM WASHING SOLUTIONS FOR RECYCLING OF SOLUTION BACK INTO THE PROCESS. DISPOSAL OF TREATMENT RESIDUALS IS DEPENDENT ON POST-TREATMENT CHARACTERIZATION.

- IN SITU BIODEGRADATION IN THE CREOSOTE LAYER AREA (FOLLOWING THE IN SITU FLUSHING):

- NUTRIENT AND OXYGEN-RICH COMPOUNDS SHALL BE INJECTED VIA THE WELL SYSTEM DESCRIBED ABOVE.

- ON-SITE LAND FARMING OF EXCAVATED SURFACE SOILS, SEDIMENTS, AND SUBSURFACE WETLAND SOILS. THE MAIN LAND FARMING OPERATION WILL BE PLACED IN NORTHEAST AREA OF SITE. SOME SOILS MAY BE LAND FARMED IN-PLACE. THE RCRA REGULATED SOIL PILE AND WESTVACO POND SEDIMENT SHALL BE LAND TREATED IN PLACE.

- CREOSOTE CONTAMINATED BOTTOM SEDIMENT IN THE RCRA REGULATED LAGOON SHALL BE BIOLOGICALLY DEGRADED IN A TANK.

- EXCAVATION/DREDGING AND CONSOLIDATION OF CONTAMINATED SEDIMENTS (DITCHES 1, 2, AND 3, AND WETLANDS), SUBSURFACE WETLANDS SOILS, BURIED PIT MATERIALS, AND SURFACE SOILS THAT ARE NOT REMEDIATED VIA IN SITU FLUSHING/BIODEGRADATION AND CANNOT BE LAND TREATED IN PLACE:

- GEOTEXTILE SILT FENCES, SEDIMENTATION BASINS, AND/OR DIVERSION/SURFACE MANAGEMENT TO CONTROL OFF-SITE SOIL TRANSPORT AND DIVERT SURFACE-WATER FLOWS.

- ORGANIC VAPOR MONITORING.

- DEWATERING OF SEDIMENTS, TREATMENT OF WATER (IF REQUIRED), AND ON-SITE DISCHARGE OF TREATED WATER.

- EROSION/SEDIMENTATION CONTROL (AS DESCRIBED FOR EXCAVATION).

- BACKFILL EXCAVATED AREAS WITH TREATED SOIL AND SEDIMENT. COVER BACKFILLED AREAS WITH TOPSOIL AND REVEGETATE.

- DURING AND POST TREATMENT GROUNDWATER MONITORING.

ALTERNATIVE 4: LAND FARMING/BIODEGRADATION

INITIAL CAPITAL COSTS: $ 2,990,000.
PRESENT WORTH OF IMPLEMENTATION: $ 18,967,000.
PRESENT WORTH OF O&M: $ 33,900.
PRESENT WORTH: $ 21,990,900.

THIS ALTERNATIVE IMPLEMENTS BIODEGRADATION OF CONTAMINANTS ASSOCIATED WITH SOILS AND SEDIMENTS AS THE SOLE REMEDIAL TECHNOLOGY. THEREFORE, REMOVAL OF PROCESS BUILDINGS WOULD BE REQUIRED TO PERMIT EXCAVATION AND SUBSEQUENT LANDFARMING OF CONTAMINATED SOILS UNDERLYING THE PROCESS BUILDINGS. AS IN THE CASE OF ALTERNATIVE 3, LANDFARMING MAY BE CONDUCTED WITH SOILS IN PLACE OR WITHIN A SPECIALLY DESIGNED TREATMENT CELL. THE OPTIMUM DESIGN FOR CONTAMINANT BIODEGRADATION AND PREVENTION OF CONTAMINANT MIGRATION WOULD BE DEVELOPED IN BENCH AND PILOT SCALE STUDIES DURING THE REMEDIAL DESIGN PHASE. TO FULLY IMPLEMENT THIS ALTERNATIVE, BUILDING REMOVAL WOULD BE REQUIRED.

THE MAJOR COMPONENTS OF ALTERNATIVE 4 INCLUDE THE FOLLOWING ACTIVITIES:

- LAND FARMING OF SURFACE SOILS IN-PLACE WHERE FEASIBLE. (THE RCRA REGULATED SOIL PILE AND WESTVACO POND SEDIMENT SHALL BE LAND TREATED IN PLACE.). LAND FARMING OF ALL SOILS AND SEDIMENTS THAT CANNOT BE LANDTREATED IN PLACE WITHIN A LANDFARM AREA ON-SITE. BOTTOM SEDIMENT FROM THE RCRA REGULATED IMPOUNDMENT SHALL BE BIOLOGICALLY TREATED IN A TANK.

- EXCAVATION/DREDGING OF CONTAMINATED SEDIMENTS (DITCHES 1, 2, AND 3, AND THE WETLANDS), SUBSURFACE WETLANDS SOILS, CREOSOTE LAYER, BURIED PIT MATERIALS, AND SURFACE SOILS THAT CANNOT BE LAND FARMED IN-PLACE (I.E., PROCESS AREA). THESE MATERIALS WILL BE LANDFARMED IN THE LAND-FARMING AREA.

- GEOTEXTILE SILT FENCES, SEDIMENTATION BASINS, AND/OR DIVERSION/SURFACE MANAGEMENT TO CONTROL OFF-SITE SOIL TRANSPORT AND DIVERT SURFACE-WATER FLOWS.

- ORGANIC VAPOR MONITORING.

- DEWATERING OF HIGHLY-CONTAMINATED SEDIMENTS PRIOR TO TREATMENT, TREATMENT, (IF REQUIRED), AND DISPOSAL OF SEDIMENT WATERS ON-SITE.

- ON-SITE LAND FARMING OF HIGHLY CONTAMINATED MATERIALS BY BLENDING WITH LOWER CONTAMINATED SOILS IN THE LANDFARMING CELLS.

- BACKFILL TREATED SOIL, REGRADE, COVER SITE WITH CLEAN SOIL COVER AND REVEGETATE.

- DURING/POST-TREATMENT MONITORING.

ALL CHEMICAL SPECIFIC ARAR'S IDENTIFIED UNDER REMEDIAL ACTION OBJECTIVES WOULD BE MET WITH THIS ALTERNATIVE. THE ATTACHED ARAR COMPLIANCE TABLE SUMMARIZES OTHER ARAR'S WHICH SHOULD BE MET.

ALTERNATIVE 5: CONTAINMENT

INITIAL CAPITAL COST: $ 1,215,000.
PRESENT WORTH OF IMPLEMENTATION: $ 18,818,000.
PRESENT WORTH OF O&M: $ 313,000.
TOTAL PRESENT WORTH: $ 20,346,000.

THIS ALTERNATIVE CONSISTS OF ESTABLISHING A CONTAINMENT AREA IN THE WESTERN HALF OF THE SITE AND DEPOSITING ALL CONTAMINATED SOILS AND SEDIMENTS OUTSIDE THIS AREA WITHIN. PRIOR TO PLACEMENT IN THE CONTAINMENT AREA, THE MATERIALS WOULD BE STABILIZED VIA A SOLIDIFICATION PROCESS. THE CONTAINMENT AREA ITSELF WOULD CONSIST OF A SLURRY WALL EXTENDING DOWN TO THE CLAY FORMATION UNDERLYING THE SITE AND A RCRA COVER. THE MAJOR COMPONENTS OF THIS ALTERNATIVE INCLUDE THE FOLLOWING:

- DIVERSION OF SURFACE WATER AND GROUNDWATER AROUND THE PROPOSED CONTAINMENT AREA UTILIZING SURFACE MANAGEMENT TECHNIQUES AND SUBSURFACE GROUNDWATER BARRIERS.

- EXCAVATION/DREDGING OF CONTAMINATED MATERIALS INCLUDING SEDIMENTS IN DITCHES 1, 2, AND 3, AND IN WESTVACO POND, SEDIMENTS AND SUBSURFACE SOILS IN THE WETLANDS, BURIED PIT MATERIALS, AND SURFACE SOILS OUTSIDE THE CONTAINMENT AREA.

- SOLIDIFICATION/STABILIZATION OF SEDIMENTS AND SOILS AS NECESSARY TO ATTAIN LOAD-BEARING CAPACITY SUFFICIENT FOR CAP PLACEMENT.

- BACKFILL DITCHES 1, 2, AND 3 AND LOW-LYING AREAS WITHIN THE CONTAINMENT AREA WITH STABILIZED MATERIAL. BACKFILL EXCAVATION AREAS OUTSIDE THE CONTAINMENT AREA WITH CLEAN FILL.

- CONSTRUCT SURFACE CAP OVER STABILIZED MATERIAL AND SURFACE SOILS WEST OF DITCH 2 AND INCLUDING THE PROCESS AREA.

- CONDUCT POST-CONSTRUCTION MONITORING.

RATHER THAN REDUCE CONTAMINANT LEVELS IN SOIL AND SEDIMENT TO TARGET CLEAN-UP LEVELS, THESE MATERIALS WOULD BE CONTAINED TO PREVENT MIGRATION TO RECEPTORS. SUCH CONTAINMENT WOULD PREVENT EXPOSURE OF RECEPTORS TO CONTAMINANT LEVELS WHICH PRESENT AN UNACCEPTABLE HEALTH RISK. IN THIS MANNER, CHEMICAL SPECIFIC ARARS DISCUSSED UNDER REMEDIAL OBJECTIVES WOULD BE MET. OTHER ARARS ARE IDENTIFIED IN THE ATTACHED ARAR COMPLIANCE TABLE.

ALTERNATIVE 6: REMOVAL/OFF-SITE OPTION

INITIAL CAPITAL COSTS: FOR INCINERATION OPTION - $ 63,576,000.

FOR LANDFILL OPTION - $ 48,002,000.
PRESENT WORTH OF IMPLEMENTATION: $ 11,027,000. (FOR BOTH OPTIONS).
PRESENT WORTH OF O&M: $ 33,900.
PRESENT WORTH: OFF-SITE INCINERATION - $ 76,137,000.
OFF-SITE DISPOSAL - $ 60,563,000.

THIS ALTERNATIVE CONSISTS OF REMOVAL, BY EXCAVATION, OF ALL SOURCES OF CONTAMINATION AT THE L. A. CLARKE SITE AND EITHER 1) DISPOSAL IN A RCRA-APPROVED LANDFILL OR 2) OFF-SITE INCINERATION IN A RCRA-APPROVED INCINERATOR. TO FULLY IMPLEMENT THIS ALTERNATIVE, BUILDING REMOVAL WOULD BE REQUIRED. THIS ALTERNATIVE INCLUDES THE FOLLOWING MAJOR ACTIVITIES:

- COMPLETE EXCAVATION/DREDGING OF CONTAMINATED MATERIALS INCLUDING SURFACE SOILS, SEDIMENTS IN DITCHES 1, 2, AND 3, WESTVACO POND, AND THE WETLANDS, BURIED PIT MATERIALS, THE CREOSOTE LAYER, AND SUBSURFACE WETLANDS SOILS.

- GEOTEXTILE SILT FENCES, SEDIMENTATION BASINS, AND/OR DIVERSION/SURFACE MANAGEMENT TO CONTROL OFF-SITE SOIL TRANSPORT AND DIVERT SURFACE-WATER/GROUNDWATER FLOWS THROUGH DITCHES.

- ORGANIC VAPOR MONITORING.

- DEWATERING OF SEDIMENTS, TREATMENT (IF REQUIRED), AND ON-SITE DISCHARGE OF SEDIMENT WATERS.

- OFF-SITE DISPOSAL/TREATMENT BY ONE OF THE FOLLOWING OPTIONS:

  - OFF-SITE THERMAL TREATMENT AND DISPOSAL AT AN OFFSITE COMMERCIAL INCINERATOR FACILITY.

  - OFF-SITE DISPOSAL AT A RCRA-APPROVED LANDFILL.

- TRANSPORT OF CONTAMINATED MATERIALS OF CONCERN.

- POST-REMEDIATION GROUNDWATER MONITORING.

CHEMICAL SPECIFIC ARARS IDENTIFIED UNDER REMEDIAL ACTION OBJECTIVES WOULD BE MET WITH THIS ALTERNATIVE. SEE ARAR COMPLIANCE TABLE FOR OTHER ARARS WHICH WOULD BE MET.

STATEMENT OF FINDINGS REGARDING FLOODPLAINS AND WETLANDS

THE RI/FS FOR L.A. CLARKE HAS DETERMINED THAT SOILS AND SEDIMENTS LOCATED WITHIN BOTH A 100-YEAR FLOODPLAIN AND WETLANDS CONTAIN SITE-RELATED CONTAMINANTS AT LEVELS WHICH CONSTITUTE AN UNACCEPTABLE RISK TO PUBLIC HEALTH AND THE ENVIRONMENT. (WETLAND AREAS WERE ASSESSED AS PART OF THE RI/FS AND ARE DISCUSSED ON PGS. 2-19 TO 2-22.). EXCAVATION AND/OR TREATMENT OF THE SOILS AND SEDIMENTS OF CONCERN WILL BE REQUIRED TO ELIMINATE THIS UNACCEPTABLE RISK. ALL REMEDIAL ALTERNATIVES IN THIS CASE WILL REQUIRE EXCAVATION EXCEPT NO ACTION, WHICH IS NOT PROTECTIVE OF PUBLIC HEALTH. UPON COMPLETION OF TREATMENT, THE SOILS AND SEDIMENTS MAY BE BACKFILLED INTO THEIR PREVIOUS LOCATION AND COVERED WITH CLEAN TOP SOIL (IF NECESSARY).

THE EXCAVATION AND FILL ACTIVITIES OF CONCERN SHALL BE CONDUCTED IN A MANNER CONSISTENT WITH PROVISIONS OF APPENDIX A OF 40 CFR PART 6. THE SUBJECT REGULATIONS HAVE BEEN ENTITLED "STATEMENT OF PROCEDURES ON FLOODPLAIN MANAGEMENT AND WETLAND PROTECTION". THESE PROCEDURES CONSTITUTE POLICY AND GUIDANCE FOR CARRYING OUT PROVISIONS OF EXECUTIVE ORDERS 11988 AND 11990. THESE ORDERS ADDRESS FLOODPLAIN MANAGEMENT AND PROTECTION OF WETLANDS RESPECTIVELY.

THE REMEDIAL DESIGN OF THE REMEDIAL ACTION SHALL BE DEVELOPED IN A MANNER CONSISTENT WITH APPENDIX A OF 40 CFR PART 6 TO ASSURE THAT POTENTIAL HARM AND ADVERSE EFFECTS TO THE FLOODPLAIN AND WETLANDS IS MINIMIZED. THE REMEDIAL DESIGN HAS NOT YET BEEN INITIATED AT THIS TIME.

THEREFORE, SPECIFIC STEPS TO MINIMIZE IMPACTS HAVE NOT YET BEEN IDENTIFIED. IN ADDITION, THE EFFECT OF THE REMEDIAL ACTION ON THE FLOODPLAIN OR WETLANDS OF CONCERN CANNOT ACCURATELY BE ASSESSED AT THIS TIME.

WHILE ALL REMEDIAL MEASURES SHALL BE DESIGNED TO MINIMIZE HARM TO WETLANDS, IT IS POSSIBLE THAT SOME ADVERSE EFFECTS MAY BE UNAVOIDABLE. SHOULD REMEDIAL ACTIVITY BE EXPECTED TO CREATE SUCH EFFECTS, RESTORATIVE MEASURES SHALL BE DEVELOPED DURING THE REMEDIAL DESIGN. SHOULD UNANTICIPATED ADVERSE EFFECTS OCCUR, RESTORATIVE MEASURES SHALL BE IMPLEMENTED AS PART OF THE REMEDIAL ACTION.

#AE
EVALUATION OF ALTERNATIVES

PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT

THE NO ACTION ALTERNATIVE WOULD NOT BE PROTECTIVE BECAUSE CONTAMINANT LEVELS IN SOILS AND SEDIMENTS WOULD CONTINUE TO PRESENT AN UNACCEPTABLE RISK TO PUBLIC HEALTH AND THE ENVIRONMENT. IN PARTICULAR, SOILS AND SEDIMENTS WOULD CONTINUE TO EXCEED CLEAN-UP LEVELS PROTECTIVE OF (1) THE SHALLOW AQUIFER FOR DRINKING WATER PURPOSES AND (2) ON-SITE WORKERS FROM UNACCEPTABLE RISK ASSOCIATED WITH DIRECT CONTACT PATHWAYS.

ALL OF THE REMAINING FIVE ALTERNATIVES ARE PROTECTIVE OF THE SHALLOW AQUIFER AND AQUATIC LIFE BY EITHER TREATING SOILS TO TARGET CLEAN-UP LEVELS, REMOVING SOILS ABOVE SUCH LEVELS OFF-SITE OR CONTAINING SUCH SOILS TO PREVENT MIGRATION. THESE SAME ALTERNATIVES ARE PROTECTIVE OF DIRECT CONTACT PATHWAYS BY PLACEMENT OF A SOIL COVER OVER THE SITE.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

ALL ALTERNATIVES WOULD MEET CHEMICAL, LOCATION AND ACTION SPECIFIC ARARS WITH THE EXCEPTION OF NO ACTION AND OFF-SITE DISPOSAL. IN THE NO ACTION ALTERNATIVE, CHEMICAL SPECIFIC ARARS WOULD NOT BE MET. IN PARTICULAR, LEVELS OF PNAS IN SURFACE SOILS WOULD CONTINUE TO PRESENT AN UNACCEPTABLE CARCINOGENIC RISK TO ON-SITE WORKERS (GREATER THAN 10-6) AND LEVELS OF PNAS AND BENZENE IN SUB-SURFACE SOILS WOULD CONTINUE TO PRESENT AN UNACCEPTABLE CARCINOGENIC RISK (GREATER THAN 10-5) TO USERS OF GROUNDWATER IN THE SHALLOW AQUIFER FOR DRINKING WATER PURPOSES. IN ADDITION, ACTION SPECIFIC RCRA ARARS WOULD NOT BE MET WITH NO ACTION. SINCE THE NO ACTION ALTERNATIVE IS NOT PROTECTIVE AND FAILS TO MEET ARARS, IT SHALL NOT BE FURTHER EVALUATED.

THE CONTAINMENT ALTERNATIVE WOULD NOT ACTUALLY REDUCE SOILS AND SEDIMENTS TO TARGET CLEANUP LEVELS. RATHER, SOILS AND SEDIMENTS EXCEEDING PNA LEVELS PROTECTIVE OF THE SHALLOW AQUIFER WOULD BE CONTAINED TO PREVENT MIGRATION INTO THE AQUIFER. HOWEVER, THE DESCRIBED CONTAINMENT ALTERNATIVE IS UNLIKELY TO MEET RCRA LANDFILL REQUIREMENTS.

OFF-SITE DISPOSAL OF UNTREATED SOILS IS LIKELY TO BE PROHIBITED BY FUTURE LAND DISPOSAL RESTRICTIONS AND THEREFORE MAY NOT MEET ACTION SPECIFIC ARARS.

IN THE CASE OF THE OTHER ALTERNATIVES, CHEMICAL, LOCATION AND/OR ACTION SPECIFIC ARARS WOULD BE MET. LOCATION AND ACTION SPECIFIC ARARS FOR EACH ALTERNATIVE ARE IDENTIFIED IN THE ARAR COMPLIANCE MATRIX. CHEMICAL SPECIFIC ARARS ARE MET BY THE TREATMENT ALTERNATIVES 2, 3 AND 4 BY REDUCING SOIL/SEDIMENT CONTAMINATION TO RISK BASED CLEAN-UP LEVELS. THE OFF-SITE INCINERATION OPTION OF ALTERNATIVE 6 REMOVES ALL SOILS/SEDIMENTS EXCEEDING THIS LEVEL OFF-SITE.

LONG TERM EFFECTIVENESS AND PERMANENCE

THE SOIL BIODEGRADATION AND INCINERATION ALTERNATIVES PROVIDE SOLUTIONS THAT ARE EQUALLY PERMANENT AND EFFECTIVE OVER THE LONG TERM. IN EACH CASE, THERE ARE LITTLE, IF ANY, TOXIC RESIDUALS GENERATED DURING THE TREATMENT OF WASTE. THE COMPOUNDS OF CONCERN, PNAS AND BENZENE, ARE PERMANENTLY DESTROYED. BOTH THE SOIL WASHING AND SOIL FLUSHING/SOIL BIODEGRADATION ALTERNATIVES ARE EXPECTED TO GENERATE QUANTITIES OF TOXIC RESIDUALS REQUIRING OFF-SITE DISPOSAL. IN EACH CASE, CONTAMINATED SOILS/SEDIMENTS ARE MIXED WITH A SURFACTANT SOLUTION WHICH REMOVES THE COMPOUNDS OF CONCERN. THE CONTAMINANTS NOW ASSOCIATED WITH THE SURFACTANT SOLUTION ARE EXTRACTED VIA A WASTEWATER TREATMENT PROCESS. TOXIC RESIDUALS ARE GENERATED BY THIS TREATMENT WHILE THE SURFACTANT SOLUTION IS RECYCLED FOR FURTHER USE. THE RESIDUALS ARE LIKELY TO BE NON-BIODEGRADABLE AND REQUIRE OFF-SITE DISPOSAL. IN THE CASE OF SOIL WASHING, ALL SITE SOILS AND SEDIMENTS WILL BE WASHED/EXTRACTED IN THIS MANNER, WHILE IN THE SOIL FLUSHING/BIODEGRADATION, ONLY SOILS UNDER THE PROCESS FACILITY WILL BE WASHED (OR FLUSHED) WITH THIS SOLUTION. THEREFORE, THE QUANTITY OF TOXIC RESIDUALS IS EXPECTED TO BE FAR GREATER FOR SOIL WASHING. IN THE CASE OF SOIL FLUSHING/SOIL BIODEGRADATION, EXTENSIVE USE OF BIODEGRADATION WILL REDUCE THE GENERATION OF SUCH RESIDUALS.

THE CONTAINMENT ALTERNATIVE PROVIDES A LESSER DEGREE OF PERMANENCE AND WILL REQUIRE CONSIDERABLE MAINTENANCE, AND POSSIBLY, SIGNIFICANT REPAIRS. SHOULD THE CONTAINMENT STRUCTURE LEAK, CONTAMINATED MEDIA WILL BE IN CONTACT WITH GROUNDWATER. SINCE THE COMPOUNDS OF CONCERN ARE NOT PERMANENTLY DESTROYED, LEACHATE EXCEEDING

RISK BASED LEVELS WOULD BE RELEASED INTO THE AQUIFER OF CONCERN SHOULD THERE BE LEAKAGE.

THE DISPOSAL ALTERNATIVE PROVIDES A LONG TERM/PERMANENT SOLUTION FOR THE L.A. CLARKE SITE. HOWEVER, ALL WASTES WOULD BE RELOCATED TO A LANDFILL. SARA SPECIFIES THAT LANDFILLING WITHOUT TREATMENT IS THE LEAST PREFERRED OPTION.

REDUCTION OF MOBILITY, TOXICITY OR VOLUME

THE SOIL BIODEGRADATION AND INCINERATION ALTERNATIVES BOTH PERMANENTLY DESTROY THE COMPOUNDS OF CONCERN, THUS REDUCING THE TOXICITY AND VOLUME OF THE WASTE TO LEVELS WHICH DO NOT PRESENT AN UNACCEPTABLE RISK TO THE PUBLIC.

THE SOIL WASHING AND SOIL FLUSHING TECHNOLOGIES DO NOT REDUCE THE TOXICITY OF THE COMPOUNDS OF CONCERN. RATHER, THE CONTAMINANTS OF CONCERN ARE REMOVED FROM THE SOIL/SEDIMENT AND RESIDUALS ARE DISPOSED, THUS REDUCING THE VOLUME OF CONTAMINATED SOIL/SEDIMENT.

THE DISPOSAL ALTERNATIVE MAY TEMPORARILY REDUCE THE MOBILITY OF THE CONTAMINANTS OF CONCERN VIA PLACEMENT IN A SECURE LANDFILL. NEITHER THE VOLUME OR TOXICITY OF CONTAMINANTS WOULD BE REDUCED.

THE CONTAINMENT ALTERNATIVE WOULD REDUCE NEITHER TOXICITY NOR VOLUME. THE MOBILITY OF WASTE WOULD BE REDUCED BY STABILIZING THE WASTE OF CONCERN VIA A SOLIDIFICATION PROCESS. HOWEVER, DUE TO THE HIGH WATER TABLE ON-SITE, THE CELL WOULD LIKELY REMAIN IN CLOSE PROXIMITY TO, OR IN CONTACT WITH, THE GROUNDWATER. THEREFORE, REDUCTION IN MOBILITY WILL BE DIFFICULT TO MAINTAIN ON A PERMANENT BASIS.

SHORT TERM EFFECTIVENESS

CURRENT CONDITIONS AT THE SITE DO NOT PRESENT AN IMMEDIATE THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT. ALL ALTERNATIVES ARE EXPECTED TO TAKE A MINIMUM OF TWO YEARS TO IMPLEMENT UPON MOBILIZATION OF OPERATIONS.

THE INCINERATION AND DISPOSAL ALTERNATIVES ARE EXPECTED TO REQUIRE RELATIVELY SHORTER DESIGN PERIODS THAN THE OTHER ALTERNATIVES AND WILL REQUIRE AN ESTIMATED TWO YEARS TO COMPLETE REMEDIAL ACTION UPON MOBILIZATION. HOWEVER, TRANSPORTATION AF CONTAMINATED MATERIALS PRESENTS A SHORT-TERM RISK WHICH DOES NOT OCCUR WITH OTHER ALTERNATIVES.). THE CONTAINMENT ALTERNATIVE IS EXPECTED TO HAVE A SIMILAR IMPLEMENTATION TIME. HOWEVER, THE DESIGN OF THE CONTAINMENT SYSTEM IS EXPECTED TO BE SIGNIFICANTLY LONGER THAN THAT REQUIRED FOR INCINERATION OR DISPOSAL.

THE SOIL WASHING, SOIL FLUSHING/SOIL BIODEGRADATION AND SOIL BIODEGRADATION ALTERNATIVES ARE ALL EXPECTED TO REQUIRE SIGNIFICANT DESIGN STUDIES PRIOR TO MOBILIZATION AND IMPLEMENTATION OF REMEDIAL ACTION. IN EACH CASE, BENCH AND PILOT SCALE STUDIES WOULD BE REQUIRED DURING THE DESIGN PHASE. ONCE MOBILIZED, SOIL WASHING AND BIODEGRADATION OPERATIONS ARE ESTIMATED TO BE COMPLETED IN THREE YEARS, WHILE SOIL FLUSHING/BIODEGRADATION IS EXPECTED TO TAKE FIVE YEARS.

ANY SHORT TERM IMPACTS TO PUBLIC HEALTH OR THE ENVIRONMENT WILL BE PREVENTED BY DESIGNING REMEDIES TO MEET ARARS OF CONCERN E.G., THOSE ADDRESSING DISCHARGES TO AIR, GROUNDWATER, SURFACE WATER AND THOSE ADDRESSING ACTIVITIES WITHIN WETLANDS. THE ARARS OF CONCERN HAVE BEEN IDENTIFIED IN THE DESCRIPTION OF ALTERNATIVES. TO ASSURE THE PREVENTION OF SHORT TERM IMPACTS, MONITORING OF AIR AND WATER SHALL BE CONDUCTED BOTH DURING AND AFTER THE IMPLEMENTATION OF THE SELECTED REMEDY. AIR MONITORING WILL BE OF IMPORTANCE DURING EXCAVATION.

IMPLEMENTABILITY

WITH THE EXCEPTION OF THE CONTAINMENT AND SOIL FLUSHING/SOIL BIODEGRADATION, ALL ALTERNATIVES REQUIRE THE REMOVAL PROCESS BUILDINGS. THESE BUILDINGS ARE ACTIVELY BEING USED AT THIS TIME. THEREFORE, BUILDING REMOVAL IS EXPECTED TO BE A SIGNIFICANT CONSTRAINT FOR ANY SUCH ALTERNATIVE.

THE SOIL FLUSHING/SOIL BIODEGRADATION ALTERNATIVE WOULD ADDRESS SOIL CONTAMINATION BELOW THE PROCESS BUILDINGS VIA IN SITU TREATMENT TECHNOLOGIES, THUS AVOIDING THE NECESSITY OF BUILDING REMOVAL. HOWEVER, REMOVAL AND TREATMENT OF THE SURFACE SOILS OF CONCERN AROUND THE FACILITY UNDER THIS ALTERNATIVE IS EXPECTED TO BE DIFFICULT. MAINTENANCE OF THE SOIL COVER PLACED AFTER THE COMPLETION OF TREATMENT SHOULD BE DIFFICULT WITH ONGOING PLANT OPERATIONS. IN THE SAME MANNER, THE MAINTENANCE OF THE CAP REQUIRED UNDER THE CONTAINMENT ALTERNATIVE (WHICH ALSO DOES NOT REQUIRE BUILDING REMOVAL) IS ALSO A POTENTIAL IMPLEMENTATION CONCERN. MAINTENANCE OF THE CAP IN THE CONTAINMENT ALTERNATIVE IS ESPECIALLY IMPORTANT DUE TO THE RELATIVELY HIGH TOXICITY OF MATERIALS WITHIN THE CONTAINED CELL.

SHOULD THE BUILDING BE REMOVED, INCINERATION OR DISPOSAL COULD BE IMPLEMENTABLE. HOWEVER, A PRIMARY IMPLEMENTABILITY CONSTRAINT WOULD BE THE CAPACITY AND AVAILABILITY OF FACILITIES TO HANDLE AND ACCEPT THE LARGE QUANTITY OF CONTAMINATED SOIL/SEDIMENT. IN THE CASE OF INCINERATION, THE MATERIAL IS EXPECTED TO HAVE A VERY LOW HEATING VALUE, ADDING TO IMPLEMENTATION CONCERNS. IN THE CASE OF DISPOSAL, LANDFILLING IS LIKELY TO BE PROHIBITED BY LAND DISPOSAL RESTRICTIONS.

SOIL WASHING AND SOIL BIODEGRADATION ARE ON-SITE TREATMENT TECHNOLOGIES WHICH COULD BE IMPLEMENTED WITH BUILDING REMOVAL. SOIL BIODEGRADATION WOULD BE MORE IMPLEMENTABLE SHOULD SOME IN-PLACE LANDFARMING BE PART OF THE REMEDY. SOIL WASHING WOULD INVOLVE THE EXCAVATION OF ALL SOILS EXCEEDING TARGET CLEANUP LEVELS. GENERALLY, BOTH THESE TWO ALTERNATIVES AND SOIL FLUSHING/SOIL BIODEGRADATION ARE EXPECTED TO REQUIRE MORE DESIGN STUDIES THAN THE OTHER ALTERNATIVES TO IDENTIFY THE SPECIFIC TREATMENT SYSTEM SUITABLE FOR THE SITE. THESE STUDIES WOULD BE MOST EXTENSIVE FOR SOIL FLUSHING/SOIL BIODEGRADATION DUE TO THE USE OF TWO DIFFERENT TECHNOLOGIES.

COMMUNITY ACCEPTANCE

THE PUBLIC HAS EXPRESSED DISSATISFACTION WITH GOVERNMENT ACTIONS REGARDING L.A. CLARKE. LOCAL RESIDENTS DO NOT UNDERSTAND WHY THE COMPANY HAS BEEN ALLOWED TO OPERATE FOR SO LONG WHILE IN VIOLATION OF ITS DISCHARGE PERMIT. ALTHOUGH AIR EMISSIONS HAVE BEEN REDUCED IN RECENT MONTHS, ODOR COMPLAINTS PERSIST.

THE ATTITUDE OF THE PUBLIC TOWARD ONGOING SUPERFUND ACTION IS ALSO ONE OF DISSATISFACTION. MANY RESIDENTS ARE SKEPTICAL OF THE TREATMENT TECHNOLOGY PROPOSED IN THE PREFERRED ALTERNATIVE AND ARE UNHAPPY WITH THE LENGTH OF TIME PROJECTED FOR THE CLEANUP. THEY HAVE POINTED TO THE L.A. CLARKE FACILITY IN HOLLYWOOD, MD., WHERE SIMILAR TREATMENT WAS ATTEMPTED AND FAILED, AS AN EXAMPLE OF WHAT MAY HAPPEN HERE.

IT CANNOT BE SAID THAT THE PUBLIC HAS ACCEPTED THE PREFERRED ALTERNATIVE. HOWEVER, MANY RESIDENTS HAVE INDICATED THEY WOULD NOT OPPOSE THE CLEANUP IF IT CAN BE SHOWN THAT IT WILL WORK. EPA HAS AGREED THAT, IF THE PREFERRED ALTERNATIVE IS CHOSEN, THE AGENCY WOULD PROVIDE THE PUBLIC INFORMATION FROM THE DESIGN PLANS AND BENCH SCALE STUDIES PRECEDING CLEANUP IMPLEMENTATION.

CLEANUP ALTERNATIVES WERE PROPOSED BY TWO MEMBERS OF THE COMMUNITY, EACH INVOLVING CONTAINMENT. EPA HAS EXPLAINED THAT CONTAINMENT MAY NOT PROVIDE A PERMANENT SOLUTION TO SITE CONTAMINATION, AND IS DISCOURAGED BY AGENCY POLICY. THE COMMUNITY AT LARGE HAS NOT VOICED SUPPORT OF CONTAINMENT OPTIONS.

STATE ACCEPTANCE

THE COMMONWEALTH OF VIRGINIA HAS RECOMMENDED THE SELECTION OF THE SOIL FLUSHING/SOIL BIODEGRADATION ALTERNATIVE SHOULD THE PROCESS BUILDINGS REMAIN IN PLACE. SHOULD THE PROCESS BUILDINGS BE REMOVED, VIRGINIA HAS RECOMMENDED THE SELECTION OF THE SOIL BIODEGRADATION ALTERNATIVE.

COST

THE PRESENT WORTH ESTIMATES FOR THE ALTERNATIVES ARE AS FOLLOWS:

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|---|---|
| ALTERNATIVE 1 - NO ACTION | $ 591,000. |
| ALTERNATIVE 2 - SOIL EXTRACTION | $ 28,956,900. |
| ALTERNATIVE 3 - SOIL FLUSHING/BIODEGRADATION | $ 23,408,900. |
| ALTERNATIVE 4 - SOIL BIODEGRADATION | $ 21,990,900. |
| ALTERNATIVE 5 - CONTAINMENT | $ 20,346,000. |
| ALTERNATIVE 6 - OFF-SITE INCINERATION/OFF-SITE DISPOSAL. | $ 60,563,000. |

SEE EVALUATION OF ALTERNATIVES TABLE FOR FURTHER COST BREAKDOWN AND A SUMMARY OF THE COMPARATIVE EVALUATION.

SUMMARY OF COMPARATIVE ANALYSIS

ALTERNATIVE 1, NO ACTION, IS NOT PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THEREFORE, IT SHOULD BE ELIMINATED FROM FURTHER CONSIDERATION.

AMONG REMAINING ALTERNATIVES, ALL ARE EXPECTED TO BE PROTECTIVE. HOWEVER, ALL REMAINING ALTERNATIVES ARE NOT EXPECTED TO MEET ARAR'S. IN PARTICULAR, ALTERNATIVE 4, CONTAINMENT, AND THE DISPOSAL OPTION OF ALTERNATIVE 6 ARE NOT EXPECTED TO MEET RCRA ARAR'S.

ALTERNATIVE 3, 4 AND THE INCINERATION OPTION OF 6 EACH RATE HIGHLY IN LONG TERM EFFECTIVENESS AND PERMANENCE. IN EACH CASE, RISK BASED LEVELS OF PNAS AND BENZENE IN SOIL ARE ACHIEVED VIA PERMANENT DESTRUCTION OF THESE COMPOUNDS. ALTERNATIVE 2 REMOVES THESE CONTAMINANTS FROM THE SOILS OF CONCERN FOR OFF-SITE DISPOSAL, WHILE THE DISPOSAL OPTION OF ALTERNATIVE 6 INVOLVES THE DISPOSAL OF ALL SOIL EXCEEDING RISK-BASED CLEANUP LEVELS OFFSITE. ALTERNATIVE 5 NEITHER DESTROYS NOR REMOVES CONTAMINANTS FROM THE SITE. THE CONTAINMENT PROPOSED WITHIN THIS ALTERNATIVE HAS A LESSER DEGREE OF PERMANENCE COMPARED TO THE OTHER ALTERNATIVES.

ALTERNATIVES 3, 4 AND THE INCINERATION OPTION OF 6 ALSO SIGNIFICANTLY REDUCE THE TOXICITY AND VOLUME OF CONTAMINATED SOIL. ALTERNATIVE 2 REDUCES THE VOLUME OF CONTAMINATED MATERIAL TO TREATMENT RESIDUALS. THE DISPOSAL OPTION OF ALTERNATIVE 6 DOES NOT DECREASE THE MOBILITY, TOXICITY OR VOLUME OF THE WASTE. ALTERNATIVE 5 WOULD REDUCE ONLY THE MOBILITY OF ON-SITE CONTAMINANTS.

SHORT TERM IMPACTS TO PUBLIC HEALTH AND THE ENVIRONMENT WOULD BE PREVENTED VIA DESIGN AND CLOSE MONITORING. IN THE CASE OF EACH ALTERNATIVE, AT LEAST TWO YEARS WOULD BE REQUIRED TO IMPLEMENT THE REMEDY. IN THE CASE OF ALTERNATIVE 6, A SHORT TERM HEALTH RISK SHALL OCCUR DUE TO THE TRANSPORT OF CONTAMINATED MATERIAL.

ALTERNATIVE 3 IS EXPECTED TO BE IMPLEMENTABLE UPON THE COMPLETION OF DESIGN STUDIES TO IDENTIFY THE SPECIFIC PROCESS FOR THE SITE. THESE STUDIES WOULD BE BENCH AND PILOT SCALE AND WOULD BE CONDUCTED FOR BOTH THE SOIL FLUSHING AND BIODEGRADATION TECHNOLOGIES. ALTERNATIVES 2 AND 4 WOULD ALSO REQUIRE BENCH AND PILOT SCALE STUDIES, BUT ONLY FOR ONE TECHNOLOGY. HOWEVER, THESE ALTERNATIVES CAN ONLY BE FULLY IMPLEMENTED WITH THE REMOVAL OF THE FACILITY. ALTERNATIVE 6 MAY BE DIFFICULT TO IMPLEMENT DUE TO LIMITED LANDFILL/INCINERATOR CAPACITY AND WOULD REQUIRE FACILITY REMOVAL AS WELL. DUE TO ACTIVE OPERATIONS, THE CAP INSTALLATION OF ALTERNATIVE 5 MAY NOT BE IMPLEMENTABLE.

GENERALLY, THE COMMUNITY HAS NOT EXPRESSED A PREFERENCE FOR ANY PARTICULAR ALTERNATIVE. RATHER, THEY ARE CONCERNED THAT THE REMEDY BE EFFECTIVE AND THAT ADVERSE SHORT-TERM IMPACTS ON HUMAN HEALTH DURING REMEDIAL ACTION BE PREVENTED.

THE COMMONWEALTH OF VIRGINIA HAS EXPRESSED A PREFERENCE FOR ALTERNATIVE 3 SHOULD REMEDIAL ACTION BE UNDERTAKEN WITH THE PROCESS BUILDING IN PLACE. SHOULD THE FACILITY BE REMOVED, VIRGINIA PREFERS ALTERNATIVE 4.

#RA
SELECTED REMEDY

ALTERNATIVE 3, IN SITU SOIL FLUSHING/BIORECLAMATION AND SOIL BIODEGRADATION VIA LANDFARMING, ACHIEVES THE BEST BALANCE IN MEETING THE EVALUATION CRITERIA AND IS THEREFORE THE RECOMMENDED REMEDIAL ACTION FOR THE SITE. THIS ALTERNATIVE UTILIZES ON-SITE BIOLOGICAL AND CHEMICAL TREATMENT TO PERMANENTLY DESTROY HAZARDOUS COMPOUNDS IN SOIL/SEDIMENT WHICH PRESENT A THREAT TO HUMAN HEALTH AND THE ENVIRONMENT. THIS ALTERNATIVE ACHIEVES A LONG TERM, PERMANENT SOLUTION AND IS READILY IMPLEMENTABLE. IT SHOULD BE NOTED THAT ALTERNATIVES 2, 4 AND 6 WOULD BE SIMILARLY EFFECTIVE IF THE ACTIVE PROCESS FACILITY WERE REMOVED. HOWEVER, ALTERNATIVE 4 WOULD ACHIEVE THE SAME RESULT AT CONSIDERABLY LESS COST. THEREFORE, SHOULD THE FACILITY BE REMOVED, ALTERNATIVE 4, SOIL BIODEGRADATION VIA LANDFARMING, MAY REPLACE ALTERNATIVE 3 AS THE REMEDIAL ACTION.

AS REQUIRED BY SECTION 121 OF CERCLA, ALTERNATIVE 3 IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, REDUCES THE VOLUME AND TOXICITY OF CONTAMINATION, WILL ATTAIN ARARS, AND UTILIZES PERMANENT SOLUTIONS AND ALTERNATE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. IN ADDITION, THE SELECTED REMEDY SATISFIES THE STATUTORY PREFERENCE FOR EMPLOYING TREATMENT WHICH SIGNIFICANTLY REDUCES THE MOBILITY, TOXICITY AND/OR VOLUME OF HAZARDOUS SUBSTANCES AS A PRINCIPAL ELEMENT. THIS ALTERNATIVE IS A MOST COST EFFECTIVE SOLUTION IN THAT IT ACHIEVES THE REMEDIAL ACTION OBJECTIVES AND MEETS THE BEST BALANCE EVALUATION CRITERIA AT THE LEAST COST.

THIS REMEDY WILL BE PROTECTIVE BY REDUCING SOIL/SEDIMENT CONCENTRATIONS TO LEVELS PROTECTIVE OF THE AQUIFER OF CONCERN FOR DRINKING WATER PURPOSES AND PROTECTIVE OF THOSE PERSONS POTENTIALLY OR ACTUALLY COMING INTO DIRECT CONTACT WITH THE CONTAMINATED SOILS/SEDIMENTS. THESE LEVELS ARE ALSO PROTECTIVE OF AQUATIC LIFE IN DOWNGRADIENT SURFACE WATERS. THE DESIGN OF THE REMEDY AND MONITORING BEFORE, DURING AND AFTER REMEDY IMPLEMENTATION WILL CONTROL CONTAMINANT RELEASES DURING REMEDIAL ACTION. INSTITUTIONAL CONTROLS NECESSARY TO MAINTAIN THE SITE AFTER REMEDIAL ACTION SHALL BE DEVELOPED. UPON COMPLETION OF THE REMEDIAL ACTION, A REVIEW OF THE EFFECTIVENESS OF THE REMEDY SHALL BE CONDUCTED EVERY FIVE YEARS TO ASSURE ON-GOING PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

ALL FEDERAL, STATE AND LOCAL ARARS WILL BE MET BY THE SELECTED REMEDY. THE ARARS OF CONCERN ARE IDENTIFIED IN THE ARAR COMPLIANCE MATRIX.

SIGNIFICANT CHANGES

THE EPA HAS REVIEWED ALL COMMENTS SUBMITTED BOTH VERBALLY AND IN WRITING DURING THE PUBLIC COMMENT PERIOD. UPON REVIEW OF THESE COMMENTS, IT HAS BEEN DETERMINED THAT NO SIGNIFICANT CHANGES IN THE PREFERRED ALTERNATIVE(S) AS PRESENTED DURING THE COMMENT PERIOD ARE NECESSARY.

#ENF
ENFORCEMENT SUMMARY (CONFIDENTIAL)

L.A. CLARKE AND SON, INC. OF SPOTSYLVANIA COUNTY, VIRGINIA HAS OPERATED AT ITS PRESENT SITE LOCATION SINCE 1937. UNTIL 1980, THE PROPERTY WAS OWNED BY THE RICHMOND, FREDERICKSBURG AND POTOMAC (R,F & P) RAILROAD AND LEASED TO L.A. CLARKE AND SON, INC. IN 1976, L.A. CLARKE PURCHASED THE PROPERTY.

NOTICE LETTERS WERE SENT TO L.A. CLARKE AND SON, INC. AND R,F & P RAILROAD ON MARCH 4, 1985, OFFERING THESE PARTIES AN OPPORTUNITY TO CONDUCT THE RI/FS. BOTH PARTIES DECLINED TO UNDERTAKE THE RI/FS. THE RI/FS WAS COMPLETED BY THE EPA IN FEBRUARY, 1988.

ON FEBRUARY 9, 1988, EPA SENT CERCLA SECTION 104(E) LETTERS TO FOUR POTENTIAL RESPONSIBLE PARTIES (PRPS) TO GAIN INFORMATION ABOUT THE SITE. ON MARCH 22, 1988, EPA SENT SPECIAL NOTICE LETTERS TO THE FOLLOWING SIX POTENTIAL RESPONSIBLE PARTIES, NOTIFYING THESE PRPS OF THEIR POTENTIAL RESPONSIBILITY TO CONDUCT THE REMEDIAL DESIGN/REMEDIAL ACTION (RD/RA) AND ESTABLISHING A 120 DAY MORATORIUM PERIOD FOR RD/RA NEGOTIATIONS:

- L.A. CLARKE AND SON, INC.
- RICHMOND, FREDERICKSBURG AND POTOMAC RAILROAD
- WESTVACO
- WOODDUCK PARTNERS
- SOLITE CORPORATION
- MASSAPONAX SAND AND GRAVEL.

#CR
COMMUNITY RELATIONS HISTORY

PUBLIC PARTICIPATION REQUIREMENTS IN SECTION 113 (K)(2)(B)(I-V) OF CERCLA HAVE BEEN MET. SPECIFICALLY, THE COMMUNITIES IN THE VICINITY OF THE SITE HAVE BEEN NOTIFIED OF THE PROPOSED PLAN AVAILABILITY AND PROVIDED A SUMMARY OF THE PLAN VIA AN ANNOUNCEMENT IN THE LOCAL PRESS ON FEBRUARY 22, 1988, THE OPENING DAY OF THE 30 DAY PUBLIC COMMENT PERIOD (SEE ATTACHED ANNOUNCEMENT). THE ADMINISTRATIVE RECORD FOR THE SITE HAS BEEN PLACED IN A REPOSITORY LOCATED WITHIN THE SPOTSYLVANIA COUNTY OFFICE.

A PUBLIC MEETING TO DISCUSS THE PROPOSED PLAN WAS HELD ON MARCH 9, 1988. THE MEETING WAS VERY WELL ATTENDED BY LOCAL RESIDENTS, WHO SHOWED THEIR CONTINUED CONCERN WITH THE SITE.

PRIOR TO THIS PUBLIC MEETING, PRIMARY COMMUNITY CONCERN WITH THE SITE WAS FOCUSED ON AIR EMISSIONS FROM THE CONTINUING ACTIVE OPERATIONS AND GROUNDWATER CONTAMINATION FROM IMPROPER CONTAINMENT OF WASTE MATERIALS. THIS INTEREST WAS EVIDENT DURING A PUBLIC MEETING HELD TO DISCUSS THE RI/FS WORKPLAN. DURING THE PUBLIC MEETING OF MARCH 9, 1988, SOME CONCERN WAS STILL EXPRESSED REGARDING CONTINUING AIR EMISSIONS. THESE CONCERNS WERE PRIMARILY RELATED TO CREOSOTE ODORS. CONCERN WAS ALSO EXPRESSED REGARDING POTENTIAL HOME WELL CONTAMINATION DUE TO DISCHARGES FROM THE SITE. THE COMMUNITY WAS ASSURED THAT EPA SAMPLING HAD FOUND NO SITE-RELATED CONTAMINATION OF HEALTH CONCERN IN LOCAL RESIDENTIAL WELLS. DURING THE MARCH 9 MEETING, RESIDENTS ALSO VOICED CONCERN OVER POTENTIAL IMPACTS ON NEIGHBORING MASSAPONAX CREEK. IT WAS EXPLAINED THAT A SURVEY OF FISH BY THE U.S. FISH AND WILDLIFE SERVICE HAD NOT FOUND A SIGNIFICANT HEALTH THREAT ASSOCIATED WITH CONSUMPTION OF FISH FROM THE CREEK.

COMMENTS DURING THE MEETING REGARDING THE PROPOSED PLAN ARE SUMMARIZED AND ADDRESSED IN THE RESPONSIVENESS SUMMARY WITHIN THIS RECORD OF DECISION. MOST OF THE COMMENTS QUESTIONED WHETHER THE PREFERRED REMEDY WOULD WORK AND BE IMPLEMENTED IN A MANNER WHICH WOULD PREVENT SHORT TERM IMPACTS TO RESIDENTS. THE COMMUNITY WAS ASSURED THAT THE REMEDIAL DESIGN WILL SPECIFICALLY ADDRESS THESE TWO CONCERNS. IT WAS EXPLAINED THAT THE REMEDY WOULD NOT BE IMPLEMENTED FULL SCALE UNTIL PILOT STUDIES DURING THE DESIGN SHOWED THAT IT WORKED. IN ADDITION, RESIDENTS WERE TOLD THAT THE DESIGN WOULD PREVENT ANY HEALTH IMPACTS TO RESIDENTS.

CONSIDERABLE COMMENTS DURING THE MEETING WERE DIRECTED AT THE VIRGINIA STATE WATER CONTROL BOARD, WHICH REGULATES THE NPDES DISCHARGES AT THE SITE.  REPRESENTATIVES OF THIS AGENCY EXPLAINED THAT THE FACILITY MAY LOSE THEIR NPDES PERMIT SHOULD THEY FAIL TO COMPLY WITH CERTAIN REGULATORY REQUIREMENTS IN THE NEAR FUTURE.

#TMA
TABLES, MEMORANDA, ATTACHMENTS

#RS

# RESPONSIVENESS SUMMARY

# FOR THE

# L.A. CLARKE SUPERFUND SITE

# SPOTSYLVANIA COUNTY, VIRGINIA

FROM FEBRUARY 22, 1988 THROUGH MARCH 22, 1988, THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) HELD A PUBLIC COMMENT PERIOD ON THE PROPOSED PLAN AND THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) FOR THE L.A. CLARKE SUPERFUND SITE IN SPOTSYLVANIA COUNTY, VIRGINIA. THE RI/FS AND OTHER INFORMATION UTILIZED BY THE EPA TO SELECT A PREFERRED REMEDIAL ALTERNATIVE IS INCLUDED IN THE ADMINISTRATIVE RECORD WHICH HAS BEEN AVAILABLE TO THE PUBLIC SINCE THE BEGINNING OF THE PUBLIC COMMENT PERIOD. IN ADDITION, COPIES OF THE PROPOSED PLAN WERE DISTRIBUTED AT THE PUBLIC MEETING. THE PURPOSE OF THIS RESPONSIVENESS SUMMARY IS TO SUMMARIZE COMMENTS ON THESE DOCUMENTS AS EXPRESSED BY RESIDENTS, LOCAL OFFICIALS, AND OTHER INTERESTED PARTIES DURING THE PUBLIC COMMENT PERIOD AND EPA'S RESPONSES TO THE COMMENTS. PUBLIC COMMENTS HAVE BEEN SUBMITTED IN WRITING AND VERBALLY.

## SUMMARY OF MAJOR COMMENTS AND EPA RESPONSES

THE PUBLIC MEETING WAS HELD AT THE LEE HILL COMMUNITY CENTER ON MARCH 9, 1988 AT 7:30 P.M. THOSE ATTENDING THE MEETING INCLUDED REPRESENTATIVES FROM EPA, THE VIRGINIA DEPARTMENT OF WASTE MANAGEMENT, THE VIRGINIA STATE WATER CONTROL BOARD, AND THE VIRGINIA STATE AIR POLLUTION CONTROL BOARD, AS WELL AS AREA NEWS REPORTERS, AND APPROXIMATELY 100 RESIDENTS. DURING THE MEETING, EPA STAFF PRESENTED AN OVERVIEW OF THE EVENTS THAT HAD OCCURRED AT THE SITE, DESCRIBED HOW THE SUPERFUND CLEANUP PROGRAM WORKS, DESCRIBED THE PROPOSED REMEDIAL ALTERNATIVES, AND EXPLAINED WHY THE EPA HAD RECOMMENDED ALTERNATIVE 3 AS THE PREFERRED ALTERNATIVE. FOLLOWING THIS PRESENTATION, THE EPA ANSWERED QUESTIONS FROM CITIZENS ABOUT THE PROPOSED REMEDIES AND THE CLEANUP OF THE SITE.

QUESTIONS, COMMENTS, AND CONCERNS RECEIVED DURING THE MEETING AND THROUGHOUT THE COMMENT PERIOD ARE SUMMARIZED BELOW AND ARE CATEGORIZED INTO THE FOLLOWING TOPICS: 1) GROUND WATER; 2) NATURE OF CONTAMINATION; 3) HEALTH EFFECTS; 4) SOIL BIODEGRADATION; 5) SOIL FLUSHING; AND 6) MISCELLANEOUS. EACH COMMENT IS FOLLOWED BY AN EPA RESPONSE. IN ADDITION TO QUESTIONS ASKED OF EPA DURING THE MEETING, CITIZENS WERE GIVEN THE OPPORTUNITY TO ASK QUESTIONS OF REPRESENTATIVES OF THE STATE WATER CONTROL BOARD AND THE STATE AIR POLLUTION CONTROL BOARD. THESE QUESTIONS AND RESPONSES ARE CONTAINED IN THE OFFICIAL TRANSCRIPT OF THE MEETING BUT ARE NOT ADDRESSED IN THIS RESPONSIVENESS SUMMARY. THE TRANSCRIPT IS AVAILABLE AT THE OFFICES OF THE SPOTSYLVANIA COUNTY ADMINISTRATOR, ROUTE 208, SPOTSYLVANIA. DETAILED COMMENTS SUBMITTED IN WRITING BY THE RICHMOND, FREDERICKSBURG AND POTOMAC RAILROAD ARE ADDRESSED SEPARATELY, BUT GIVEN EQUAL WEIGHT IN THIS RESPONSIVENESS SUMMARY.

### GROUND WATER

QUESTION: SEVERAL CITIZENS ASKED QUESTIONS ABOUT THE EXTENT OF GROUND WATER CONTAMINATION IN THE DEEP AQUIFER UNDERLYING THE SITE.

RESPONSE: EPA SAMPLING OF GROUND WATER FROM THE DEEP AQUIFER UNDERLYING THE SITE HAS NOT DETECTED ANY SITE-RELATED CONTAMINATION.

QUESTION: SEVERAL CITIZENS WANTED TO KNOW HOW THE EPA WILL PREVENT CONTAMINATION FROM REACHING THE DEEP AQUIFER WHEN GROUND WATER MONITORING WELLS ARE DRILLED THROUGH THE CLAY LAYER INTO THE DEEP AQUIFER.

RESPONSE: A DOUBLE-CASED WELL TECHNIQUE WILL BE USED TO PREVENT CONTAMINATION OF THE DEEP AQUIFER WHILE DRILLING THROUGH THE CLAY LAYER.

QUESTION: A CITIZEN ASKED WHETHER CONTAMINATION IN THE GROUND WATER IS MOVING AND WHETHER THE EPA'S STATEMENT THAT CONTAMINATION IS CONFINED UNDER THE SITE WAS CORRECT.

RESPONSE: THE EPA WILL CONDUCT A THOROUGH GROUND WATER INVESTIGATION AND MONITORING PROGRAM DURING THE REMEDIAL DESIGN, REMEDIAL ACTION, AND CONTINUING RI/FS STUDIES, TO FURTHER DETERMINE THE NATURE AND EXTENT OF GROUND WATER CONTAMINATION.

QUESTION: SEVERAL CITIZENS ASKED WHETHER THE CONTAMINATED GROUND WATER IS MOVING OFF-SITE INTO RESIDENTIAL

WELLS. ONE RESIDENT STATED THAT THE EPA FOUND CADMIUM IN WELL WATER AND WONDERED IF ANY ACTION WOULD BE TAKEN TO ADDRESS THIS PROBLEM.

RESPONSE: DURING THE MEETING, RESIDENTS WERE TOLD THAT THERE WERE NO SITE-RELATED CONTAMINANTS AT LEVELS OF HEALTH CONCERN IN LOCAL DRINKING WATER WELLS. PHENOL LEVELS, WELL BELOW HEALTH STANDARDS, HAVE BEEN DETECTED IN WELLS BOTH UP GRADIENT AND DOWN GRADIENT OF THE SITE. THESE LEVELS CANNOT BE ATTRIBUTED TO THE SITE AT THIS TIME. THE EPA WILLCONDUCT COMPREHENSIVE GROUND WATER INVESTIGATIONS BEGINNING THIS SUMMER TO BETTER DEFINE THE NATURE AND EXTENT OF SITE-RELATED GROUND WATER CONTAMINATION. EPA ADDED THAT SEVERAL RESIDENTIAL WELLS IN THE VICINITY THE SITE CONTAIN CADMIUM AT LEVELS SLIGHTLY HIGHER THAN EPA DRINKING WATER CRITERIA. HOWEVER, CADMIUM CONTAMINATION HAS NOT BEEN DETECTED AT THE SITE AND THE ELEVATED CADMIUM LEVELS IN WELL WATER MAY BE DUE TO NATURAL CONDITIONS OR CORROSION OF PIPES IN WATER SYSTEMS. GROUND WATER CONTAMINATION NOT RELATED TO THE L.A. CLARKE SITE CANNOT BE ADDRESSED AS PART OF THIS PROJECT.

QUESTION: A CITIZEN ASKED WHETHER THE EPA WOULD SUPPORT A FEDERAL GRANT TO CONSTRUCT A WATERLINE TO SERVE THE COMMUNITY.

RESPONSE: RESULTS OBTAINED FROM RESIDENTIAL WELL SAMPLES DO NOT INDICATE THAT GROUND WATER CONTAMINATION IS RELATED TO THE LA CLARKE SITE, THUS A WATERLINE COULD NOT BE FUNDED UNDER THIS SUPERFUND RESPONSE.

QUESTION: A CITIZEN ASKED EPA TO PROVIDE PUBLIC WATER AND SEWER LINES TO ALL PROPERTIES WITHIN 3/4 MILE OF THE SITE.

RESPONSE: AT THIS TIME, RESIDENTIAL WELLS NEAR THE SITE ARE NOT BEING IMPACTED SIGNIFICANTLY FROM SITE CONTAMINATION. THIS REMEDIAL ACTION AND FUTURE ACTIONS SHOULD RESULT IN AN IMPROVEMENT IN GROUND WATER QUALITY NEAR THE SITE. EPA WILL CONTINUE TO MONITOR GROUND WATER THROUGHOUT THE PROJECT TO BE SURE THAT RESIDENTIAL WELLS ARE NOT CONTAMINATED.

QUESTION: SEVERAL COMMENTORS SUGGESTED THAT GROUND WATER MONITORING BE CONDUCTED DURING AND AFTER SITE CLEANUP ACTIVITIES.

RESPONSE: GROUND WATER MONITORING WILL CONTINUE THROUGHOUT THE PROJECT, AND FOR AT LEAST FIVE YEARS AFTER COMPLETION.

NATURE OF CONTAMINATION

QUESTION: A CITIZEN ASKED WHETHER SITE-RELATED CONTAMINANTS OF CONCERN SUCH AS BENZENE AND POLYNUCLEAR AROMATIC HYDROCARBONS (PNAS) MAY BECOME AIRBORNE.

RESPONSE: BENZENE, WHICH IS A CONSTITUENT OF CREOSOTE, IS A VOLATILE SOLVENT WHICH CAN BECOME AIRBORNE.

QUESTION: A CITIZEN ASKED WHY THE EPA DID NOT FIND DIOXIN AT THE L.A. CLARKE SITE AS IT DID AT THE HOLLYWOOD, MARYLAND SITE, CONSIDERING THE FACT THAT BOTH SITES ARE WOOD PRESERVING FACILITIES RUN BY THE SAME COMPANY. THE CITIZEN ADDED THAT THE EPA DID NOT FIND DIOXIN AT THE HOLLYWOOD SITE UNTIL IT DRAINED THE LAGOON.

RESPONSE: DIOXIN WAS FOUND AT THE HOLLYWOOD SITE BECAUSE THE WOOD PRESERVING OPERATIONS THERE USED PENTACHLOROPHENOL (PCP), WHICH CONTAINS DIOXIN, WHILE THE OPERATIONS AT L.A. CLARKE DID NOT USE PCP. EPA FURTHER STATED THAT MORE THAN 200 SAMPLES TAKEN AT THE L.A. CLARKE SITE WERE ANALYZED AND THAT NONE WERE FOUND TO CONTAIN PENTACHLOROPHENOL.

HEALTH EFFECTS

QUESTION: A CITIZEN ASKED ABOUT THE HUMAN HEALTH EFFECTS OF CREOSOTE.

RESPONSE: EPA RESPONDED THAT PROLONGED EXPOSURE TO HIGH LEVELS OF COMPOUNDS FOUND IN CREOSOTE IS KNOWN TO INCREASE THE RISK OF CANCER.

QUESTION: A CITIZEN THEN ASKED ABOUT THE CANCEROUS LESIONS FOUND ON FISH IN A NEARBY POND.

RESPONSE: THE TYPE OF LESIONS FOUND ON THE FISH ARE THE TYPE THAT WOULD BE ASSOCIATED WITH DIRECT CONTACT TO HIGH CONCENTRATIONS OF CREOSOTE. THE FISH MAY HAVE BEEN EXPOSED TO CREOSOTE DEPOSITED IN BOTTOM SEDIMENTS OF THE POND.

QUESTION: A RESIDENT ASKED WHETHER CONTAMINATION FROM THE SITE IS AFFECTING NEARBY CREEKS THAT FLOW INTO THE MASSAPONAX RIVER AND WHETHER THE CREEKS WILL EVER BE SAFE FOR RECREATIONAL PURPOSES.

RESPONSE: CURRENT INFORMATION DOES NOT INDICATE A SIGNIFICANT HEALTH RISK ASSOCIATED WITH FISHING OR HUNTING IN THE AREA DOWN-STREAM FROM THE SITE.

SOIL BIODEGRADATION TECHNOLOGY

QUESTION: A CITIZEN ASKED WHETHER SOIL BIODEGRADATION IS THE SAME APPROACH USED AT THE HOLLYWOOD, MARYLAND CREOSOTE SITE AND EXPRESSED CONCERNS ABOUT THE EFFECTIVENESS OF THE TECHNOLOGY.

RESPONSE: THE TECHNOLOGY PROPOSED FOR THE L.A. CLARKE SITE AND THE TECHNOLOGY ATTEMPTED AT THE HOLLYWOOD SITE ARE BASICALLY THE SAME. A CRITICAL FACTOR IN IMPLEMENTING THIS TECHNOLOGY IS PROPER MAINTENANCE. THE PROCEDURE WAS NOT EFFECTIVE AT THE HOLLYWOOD SITE BECAUSE IT WAS NOT PROPERLY MAINTAINED. THIS OPERATION WAS NOT CONDUCTED OR SUPERVISED BY THE EPA.

QUESTION: CITIZENS ASKED MANY QUESTIONS ABOUT THE BIODEGRADATION PROCESS.

RESPONSE: THE TYPE OF BACTERIA THAT EXIST AT THE SITE HAVE NOT BEEN IDENTIFIED AT THIS TIME. BACTERIA ARE NATURALLY OCCURRING AT THE SITE BUT THE PROPER CONDITIONS MUST BE MAINTAINED FOR THE BACTERIA TO WORK EFFECTIVELY. THE BACTERIA MUST BE "FARMED" TO CREATE THE PROPER ENVIRONMENT. SPECIFICALLY, THE SOIL MUST BE TILLED TO SUPPLY MORE OXYGEN, AND NUTRIENTS ADDED TO PROMOTE BACTERIA GROWTH. THIS WILL RESULT IN BIODEGRADATION OF CREOSOTE AND A REDUCTION IN THE LEVELS OF CONTAMINANTS.

QUESTION: CITIZENS ASKED HOW THE "BUGS" (BACTERIA) DIGEST CREOSOTE AND WHAT HAPPENS TO THE "BUGS" OVER TIME.

RESPONSE: THE BACTERIA WILL "EAT" THE CREOSOTE, AND DESTROY IT IN THE PROCESS. THE BACTERIA METABOLIZE TOXIC COMPOUNDS FOUND WITHIN CREOSOTE AND CONVERT THEM TO NON-TOXIC COMPOUNDS.

QUESTION: A CITIZEN ASKED WHETHER LAND FARMING WOULD CREATE ODORS AT THE SITE.

RESPONSE: AIR MONITORING WILL BE CONDUCTED DURING THE REMEDIAL ACTION TO ENSURE THAT THE ODORS AT THE SITE DO NOT EXCEED RULES AND REGULATIONS WHICH ADDRESS ODORS AND AIR EMISSIONS. IF ODORS ARE DETECTED AT LEVELS EXCEEDING THE REGULATIONS, ACTIVITIES AT THE SITE WILL BE STOPPED UNTIL THE PROBLEM IS CORRECTED.

QUESTION: A CITIZEN ASKED HOW THE EPA WOULD DISPOSE OF DIRTY WATER FROM THE LAND FARM AREA.

RESPONSE: CONTAMINATED WATER GENERATED DURING THE CLEANUP OPERATIONS WILL BE TREATED ON-SITE. TOXIC RESIDUALS THAT EXIST IN THE WATER WILL EITHER BE BIODEGRADED ON-SITE OR DISPOSED OF OFF-SITE.

SOIL FLUSHING TECHNOLOGY

QUESTION: ONE RESIDENT ASKED WHETHER CONTAMINANTS WOULD MOVE INTO THE BEDROCK AQUIFER WHEN EXTRACTION WELLS FOR SOIL FLUSHING ARE INSTALLED. A RESIDENT ASKED WHETHER THE EPA WOULD BE RESPONSIBLE FOR ANY CONTAMINATION THAT MIGHT OCCUR IN RESIDENTIAL WELLS DUE TO THEINSTALLATION OF THE EXTRACTION WELLS.

RESPONSE: THE CLAY LAYER SEPARATING THE SHALLOW AQUIFER FROM THE DEEP AQUIFER IS LIKELY TO PREVENT CONTAMINANTS FROM ENTERING THE DEEP AQUIFER. GROUND WATER MONITORING WILL BE CONDUCTED TO ENSURE THAT CHEMICALS ARE NOT ENTERING THE DEEP AQUIFER.

QUESTION: A CITIZEN ASKED WHAT TYPE OF SOIL FLUSHING SOLUTION WILL BE USED AND HOW THE EPA WILL PREVENT THE SOLUTION FROM SPREADING LATERALLY UNDER THE GROUND AFTER IT IS INJECTED INTO THE SOIL.

RESPONSE: STUDIES WILL BE CONDUCTED TO DETERMINE THE MOST EFFECTIVE SOIL FLUSHING SOLUTION FOR CONDITIONS AT THE SITE. SMALL-SCALE TESTS OF THE TECHNOLOGY WILL BE CONDUCTED BEFORE IT IS FULLY IMPLEMENTED, DRILLING ONE WELL AT A TIME TO DETERMINE THE BEST PROCEDURES FOR CONTAINING AND RECOVERING THE SOLUTION.

COMMUNITY RELATIONS

COMMENT: SEVERAL CITIZENS EXPRESSED DOUBT THAT THEIR VIEWS WOULD BE CONSIDERED BEFORE A FINAL DECISION WAS MADE.

RESPONSE: A FINAL DECISION CANNOT BE MADE WITHOUT ADDRESSING AND ANSWERING COMMENTS IN THE RESPONSIVENESS

SUMMARY. THIS SUMMARY IS MADE PART OF THE RECORD OF DECISION (ROD), AND INCLUDES ALL ORAL AND WRITTEN COMMENTS RECEIVED DURING THE COMMENT PERIOD. COPIES OF THIS SUMMARY WILL BE MADE AVAILABLE TO THE PUBLIC.

QUESTION: A CITIZEN ASKED WHY MORE PUBLIC MEETINGS HAD NOT BEEN HELD.

RESPONSE: DURING THE WORK PLAN PUBLIC MEETING, RESIDENTS WERE TOLD THAT THE NEXT REGULARLY SCHEDULED MEETING WOULD BE AT THE CONCLUSION OF THE FS. AT THAT TIME, EPA OFFICIALS SAID THEY WOULD MEET SOONER IF REQUESTED. IF ANYONE DESIRES A MEETING WHEN THE FINAL ROD IS SIGNED, THEY SHOULD CONTACT EPA.

QUESTION: SEVERAL CITIZENS ASKED WHAT TYPE OF FOLLOW-UP TO THE PUBLIC MEETING EPA WOULD CONDUCT.

RESPONSE: EPA WILL MAIL A NOTICE TO ANNOUNCE THE RECORD OF DECISION AFTER IT IS SIGNED. EPA ALSO OFFERED TO RETURN TO THE COMMUNITY TO EXPLAIN THE RECORD OF DECISION. THE SITE ADMINISTRATIVE RECORD, WHICH WILL CONTAIN SITE RECORDS - INCLUDING THE PUBLIC MEETING TRANSCRIPT - PERTAINING TO THE DECISION, WILL BE PLACED IN THE COUNTY OFFICE BUILDING. EPA MAY HOLD A PUBLIC MEETING AT THE START OF THE GROUND WATER INVESTIGATION.

MISCELLANEOUS

QUESTION: RESIDENTS ASKED HOW LONG THE PROPOSED RECOMMENDED CLEANUP PROCESS WOULD TAKE.

RESPONSE: THE SCHEDULE FOR THE CLEANUP DEPENDS, TO A GREAT EXTENT, ON THE RESULTS OF FIELD TESTS CONDUCTED DURING DESIGN. THE SOIL FLUSHING AND LAND FARMING TECHNOLOGIES REQUIRE APPROXIMATELY FIVE YEARS TO COMPLETE. EPA STATED THAT THE DESIGN OF THE CLEANUP WILL BEGIN THIS SUMMER AND MAY TAKE APPROXIMATELY YEAR TO COMPLETE.

QUESTION: A CITIZEN ASKED HOW LONG THE OTHER FS ALTERNATIVES WOULD REQUIRE TO COMPLETE.

RESPONSE: SOIL FLUSHING WILL REQUIRE APPROXIMATELY THREE YEARS TO COMPLETE; SOIL BIODEGRADATION WITHOUT SOIL FLUSHING WOULD REQUIRE APPROXIMATELY THREE YEARS; AND CONTAINMENT, OFF-SITE DISPOSAL, AND OFF-SITE INCINERATION WOULD EACH TAKE APPROXIMATELY TWO YEARS.

QUESTION: A CITIZEN ASKED WHO MAKES THE FINAL CLEANUP DECISION.

RESPONSE: THE EPA REGION III REGIONAL ADMINISTRATOR MAKES THE FINAL DECISION BASED ON STAFF RECOMMENDATIONS, TECHNICAL REPORTS AND THE RESPONSIVENESS SUMMARY.

QUESTION: A CITIZEN WANTED TO KNOW WHO WOULD FUND THE CLEANUP AT THE SITE AND WHETHER THE EPA HAS FUNDS AVAILABLE FOR THE CLEANUP.

RESPONSE: THE EPA IS PREPARED TO CONDUCT AND PAY FOR THE CLEANUP USING MONEY FROM THE SUPERFUND TRUST FUND. EPA WILL FIRST NEGOTIATE WITH POTENTIALLY RESPONSIBLE PARTIES TO ENCOURAGE THEM TO CONDUCT THE CLEANUP. IF THE NEGOTIATIONS FAIL, EPA POLICY IS TO CONDUCT THE CLEANUP AND TAKE LEGAL ACTION AGAINST THE POTENTIALLY RESPONSIBLE PARTIES TO RECOVER CLEANUP COSTS.

COMMENT: SEVERAL CITIZENS HAVE REQUESTED THAT EPA SHUT DOWN THE FACILITY AS PART OF THE REMEDIAL ACTION.

RESPONSE: AT THIS TIME, EPA'S SUPERFUND PROGRAM IS NOT IN A POSITION TO SHUT THIS FACILITY DOWN. THE VIRGINIA WATER CONTROL BOARD IS REVIEWING THE FACILITY'S DISCHARGE PERMIT, AND IS CONSIDERING REVOCATION OF THE PERMIT. EPA IS COMMITTED TO WORKING WITH THE SITE OWNERS TO IMPLEMENT A CLEANUP WHICH WILL ALLOW OPERATIONS TO CONTINUE.

QUESTION: A LOCAL FAMILY ASKED WHAT GUARANTEE WOULD BE ISSUED TO BE SURE THE CLEANUP IS MONITORED CONSTANTLY.

RESPONSE: ALTHOUGH THE AGENCY CANNOT GIVE GUARANTEES, IT IS COMMITTED TO MAKING SURE THE CLEANUP IS IMPLEMENTED PROPERLY. CLEANUP TECHNIQUES WILL BE TESTED BEFORE IMPLEMENTATION, AND CITIZENS WILL HAVE THE OPPORTUNITY TO REVIEW THE PROGRESS OF THE PROJECT.

COMMENT: SEVERAL CITIZENS, INCLUDING ONE WHO SUBMITTED A TWO-PAGE CLEANUP PLAN, SUGGESTED THAT THE BEST WAY TO ADDRESS CONTAMINATION WOULD BE TO CONTAIN IT ON SITE.

RESPONSE: IT IS EPA'S POLICY TO ELIMINATE OR REDUCE CONTAMINATION FROM SUPERFUND SITES WHENEVER POSSIBLE. BECAUSE THIS GOAL IS FEASIBLE AT THE L.A. CLARKE SITE, IT MUST BE GIVEN STRONG CONSIDERATION.

COMMENT: THE GOVERNMENT SHOULD SET UP AN ADVISORY PANEL COMPRISED OF GOVERNMENT REPRESENTATIVES, POTENTIALLY RESPONSIBLE PARTIES AND ADJACENT LANDOWNERS. THIS PANEL SHOULD REVIEW ALL CLEANUP STEPS TAKEN.

RESPONSE: EPA HAS SOUGHT INPUT FROM THESE ENTITIES THROUGHOUT THE PROJECT. HOWEVER, THE AGENCY WILL CONSIDER ESTABLISHING SUCH A REVIEW PANEL IF IT IS DESIRED BY ALL PARTIES INVOLVED.

COMMENT: EPA SHOULD CONSTRUCT RECREATIONAL FACILITIES ON THE SITE WHEN THE CLEANUP IS COMPLETE.

RESPONSE: AT THIS TIME, IT IS IMPOSSIBLE TO DETERMINE AN APPROPRIATE FUTURE USE OF THIS LAND. THIS SUGGESTION WILL BE CONSIDERED.

QUESTION: A LOCAL LANDOWNER ASKED EPA NOT TO SPEND $23 MILLION CLEANING UP THIS SITE WHEN CHEAPER ALTERNATIVES ARE AVAILABLE.

RESPONSE: TO DATE, EPA HAS SEEN NO PROPOSAL WHICH EFFECTIVELY ADDRESSES CONTAMINATION AT THE L.A. CLARKE SITE AND IS SIGNIFICANTLY LESS COSTLY THAN THE PREFERRED ALTERNATIVE.

QUESTION: OWNERS OF PROPERTY ADJACENT TO THE SITE ASKED WHETHER THEY MAY REVIEW WORKPLANS DESCRIBING FUTURE EPA ACTIVITY OR COMMENT ON FUTURE REMEDIAL ACTIONS.

RESPONSE: ALL WORKPLANS WILL BE AVAILABLE AT THE SPOTSYLVANIA COUNTY ADMINISTRATOR'S OFFICE. EXTRA COPIES CAN BE OBTAINED THROUGH EPA REGION III. ALL FUTURE REMEDIAL ACTION WILL BE SUBJECT TO A 30-DAY PUBLIC COMMENT PERIOD.

QUESTION: AN ADJACENT PROPERTY OWNER ASKED THAT EPA CLEANUP ACTIVITIES ON HIS LAND NOT DISTURB HIS OPERATIONS.

RESPONSE: EPA WILL WORK WITH THE LANDOWNER DURING CLEANUP ACTIVITIES.

## ADDITIONAL COMMENTS

COMMENT: SEVERAL CITIZENS HAVE REQUESTED EPA SHUT DOWN THE FACILITY AS PART OF THE REMEDY.

RESPONSE: AT THIS TIME, EPA DOES NOT HAVE THE LEGAL AUTHORITY TO SHUT DOWN THE FACILITY. HOWEVER, SHOULD THE FACILITY BE SHUT DOWN BY THE SITE OWNERS OR BY OTHER MEANS, THE EPA MAY IMPLEMENT ALTERNATIVE 4, SOIL BIODEGRADATION VIA LAND FARMING. THIS ALTERNATIVE INVOLVES THE REMOVAL OF THE FACILITY AND EXCAVATION OF UNDERLYING CONTAMINATED SOILS FOR TREATMENT ON-SITE.

COMMENT: SEVERAL COMMENTERS HAVE SUGGESTED THAT GROUNDWATER MONITORING BE CONDUCTED DURING AND AFTER THE SITE CLEAN-UP ACTIVITIES.

RESPONSE: THE EPA PLANS TO CONDUCT GROUNDWATER MONITORING BEFORE, DURING AND AFTER THE SITE-CLEANUP. BOTH ON-SITE MONITORING WELLS AND RESIDENTIAL WELLS SHALL BE SAMPLED REGULARLY. GROUNDWATER MONITORING SHALL CONTINUE FOR A MINIMUM OF FIVE YEARS AFTER THE CLEANUP IS COMPLETED. IN ADDITION, AIR MONITORING SHALL BE CONDUCTED DURING SITE CLEAN-UP.

COMMENT: SEVERAL RESIDENTS HAVE SUGGESTED VARIOUS FORMS OF CONTAINMENT TO ADDRESS THE SOIL/SEDIMENT CONTAMINATION PROBLEM AT THE SITE. THESE SUGGESTIONS RANGE FROM LINING THE ENTIRE SITE WITH CLAY TO CONTAINING LEACHATE WITH TRENCHES.

RESPONSE: A CONTAINMENT ALTERNATIVE HAS BEEN EVALUATED BY EPA IN THE RI/FS. EPA DOES NOT PREFER THIS ALTERNATIVE BECAUSE THE HAZARDOUS SUBSTANCES OF CONCERN WILL REMAIN ON-SITE. CONTAINMENT TO PREVENT THE MIGRATION OF THESE SUBSTANCES IS NOT LIKELY TO BE PERMANENT AND WILL REQUIRE CONTINUAL MAINTENANCE. THE EPA PREFERS TO DESTROY THE HAZARDOUS SUBSTANCES THROUGH TREATMENT TO ELIMINATE THE POSSIBILITY OF MIGRATION OF THESE SUBSTANCES THROUGH THE LEAKAGE OF A CONTAINMENT STRUCTURE.

COMMENT: ONE COMMENTER SUGGESTED THAT THE ALTERNATIVE SELECTED SHOULD INCLUDE THE CONSTRUCTION OF A RECREATIONAL FIELD AT THE SITE AFTER CLEANUP.

RESPONSE: THE EPA'S PREFERRED ALTERNATIVE DOES NOT PRECLUDE THE FUTURE USE OF THE SITE AS A RECREATIONAL FIELD.

COMMENT: AN OWNER OF PROPERTY ADJACENT TO THE SITE HAS ASKED WHETHER THEY MAY REVIEW WORKPLANS DESCRIBING

FUTURE EPA ACTIVITY AT THE SITE OR COMMENT ON THE SELECTION OF ANY FUTURE REMEDIAL ACTIONS AT THE SITE.

RESPONSE: ALL WORKPLANS WILL BE AVAILABLE IN THE ADMINISTRATIVE RECORD FOR THE SITE LOCATED IN THE SPOTSYLVANIA COUNTY OFFICE. WRITTEN COPIES MAY ALSO BE REQUESTED OF EPA THROUGH THE FREEDOM OF INFORMATION ACT. ALL FUTURE REMEDIAL ACTIONS WILL ALSO BE SUBJECT TO A 30 DAY PUBLIC COMMENT PERIOD.

STOEL, RIVES, BOLEY, JONES AND GREY HAS SUBMITTED COMMENTS ON BEHALF OF THE RICHMOND, FREDERICKSBURG, & POTOMAC RAILROAD COMPANY TO THE EPA WITHIN THE THIRTY DAY PUBLIC COMMENT PERIOD. ONE SET OF COMMENTS, DATED MARCH 18, 1988, WAS PROVIDED TO THE EPA ON MARCH 18, 1988. A SECOND SET OF COMMENTS WAS SUBMITTED TO EPA ON MARCH 22, 1988. BOTH SETS OF COMMENTS ARE PART OF THE ADMINISTRATIVE RECORD.

BELOW ARE EPA RESPONSES TO THE COMMENTS NOTED ABOVE. TO IDENTIFY THE SPECIFIC COMMENTS, PLEASE SEE THE ADMINISTRATIVE RECORD.

SUMMARY OF RF&P RAILROAD COMPANY
MARCH 18TH COMMENTS AND EPA RESPONSES

RESPONSE TO COMMENT I.A.1 AND I.A.2, 3/18/88, P. 1:

CONTAMINANTS FOUND IN THE SEDIMENTS AND SOIL ABOVE HEALTH BASED RISK LEVELS WILL BE REMOVED AND TREATED. ALSO SEE RESPONSE TO COMMENT A.1 OF 3/22/88.

RESPONSE TO COMMENT I.A.3, 3/18/88, P. 1:

DILUTION APPEARS TO BE A MAJOR FACTOR IN THE REDUCTION OF PNA CONCENTRATIONS ACROSS THE SITE IN THE WETLANDS. OTHER FACTORS MAY ALSO PLAY A ROLE. IN EITHER CASE, SURFACE WATER PNA CONCENTRATIONS HAVE BEEN DOCUMENTED AT A VARIETY OF LOCATIONS ON AND OFF-SITE AND THIS PATHWAY DOES NOT APPEAR TO BE A MAJOR CONTAMINANT PATHWAY. REGARDING ATTENUATION MECHANISMS, ALSO SEE RESPONSE TO COMMENT B.2, 3/22/88.

RESPONSE TO COMMENT I.A.4, 3/18/88, P. 1:

THE RELATIVE IMPORTANCE OF MIGRATION PATHWAYS HAS BEEN ASSESSED AND THE ANALYTICAL AND HYDROGEOLOGICAL DATA FROM THE RI USED IN MODELING FOR CURRENT AND FUTURE SCENARIOS.

RESPONSE TO COMMENT I.B.1, 2 & C, 3/18/88, PP. 1, 2:

THE RI STATES ON PAGE 5-7 THAT CREOSOTE "IS A COMPLEX MIXTURE OF HUNDREDS OF ORGANIC COMPOUNDS, MANY OF WHICH ARE POLYNUCLEAR AROMATICS, WHICH VARY IN COMPOSITION FROM SOURCE-TO-SOURCE. WHEN RELEASED TO THE ENVIRONMENT, THE COMPONENTS OF CREOSOTE ARE SUBJECT TO DIFFERENTIAL CHEMICAL FATE AND TRANSPORT PROCESSES.". IN FACT, ALL CPNA'S DO NOT TRAVEL AT EXACTLY THE SAME RATE. THE MOST COST-EFFECTIVE RI APPROACH CHOSEN WAS TO UTILIZE A SCREENING METHOD FOR ANALYSIS OF A VERY LARGE NUMBER OF SAMPLES FOR TPNAS AND ANALYTICALLY DETERMINE A REPRESENTATIVE FRACTION OF THE CPNAS. HOWEVER, THE PUBLIC HEALTH EVALUATION DOES ACCOUNT FOR THE DIFFERENT MIGRATION RATES FOR TPNAS AND CPNAS THROUGH THE USE OF DIFFERENT PARTITION COEFFICIENTS (KD). ALSO SEE THE RESPONSE TO THE 3/22/88 COMMENT A.9.

THE RI ALSO STATES ON PAGE 5-8, "SOME OF THE EXPOSURE SCENARIOS TO BE ASSESSED IN THIS PHE REQUIRE AN ASSESSMENT OF TOTAL PNAS (TPNAS) AND OTHERS USE ONLY CARCINOGENIC PNAS (CPNAS). DURING REMEDIATION, VERIFICATION SAMPLING CAN FOCUS ON TPNAS, CPNAS OR AN INDIVIDUAL CPNA SHOULD THAT BE DEEMED APPROPRIATE.

RESPONSE TO COMMENT II.A.1, 3/18/88, P. 2:

THE UV DATA ACCURATELY DESCRIBES TPNA CONCENTRATIONS. DURING THE VALIDATION PROCESS IT WAS DETERMINED THAT IN ALL CASES TESTED UV FLUORESCENCE SCREENING GAVE TOTAL PNA CONCENTRATIONS WITHIN ONE ORDER OF MAGNITUDE OF TOTAL PNA CONCENTRATION DERIVED FROM GC/MS ANALYSIS. ENHANCED MIXING OF SAMPLES IN THE FIELD WOULD NO DOUBT HAVE PRODUCED A BETTER CORRELATION BETWEEN ANALYTICAL METHODS. REGARDLESS, THE CORRELATION BETWEEN TPNA AND CPNA CONCENTRATIONS WAS MADE VIA A REGRESSION MODEL APPLIED TO THE HSL DATA AS DETAILED IN APPENDIX K. ALSO SEE RESPONSE TO COMMENT B.2, 3/22/88.

RESPONSE TO COMMENT II.A.2, 3/18/88, P. 2:

SEE RESPONSE TO COMMENT B.2, 3/22/88.

RESPONSE TO COMMENT II.A.3, 3/18/88, P. 2:

SEE RESPONSE TO COMMENT B.2, 3/22/88.

RESPONSE TO COMMENT II.B.1, 3/18/88, P. 2:

SEE RESPONSE TO COMMENT B.5, 3/22/88.

RESPONSE TO COMMENT II.B.2, 3/18/88, P. 2:

THIS IS TRUE, HOWEVER, TESTING WAS NOT PERFORMED FOR PNA METABOLITES AND ALL PNA COMPONENTS OF CREOSOTE.

RESPONSE TO COMMENT III.A.1, 3/18/88, P. 2:

HOME WELLS IDENTIFIED AND SAMPLED BY EPA ARE UPGRADIENT.

RESPONSE TO COMMENT III.A.2 AND III.A.3, 3/18/88, P. 2, 3:

CONTAMINATION CHARACTERISTIC OF THE SHALLOW AQUIFER HAS NOT BEEN (TO DATE) FOUND IN THE DEEP AQUIFER IN ON-SITE WELLS MONITORING THESE ZONES. THIS DOES NOT PRECLUDE FUTURE MIGRATION OR CROSS CONTAMINATION IN OFF-SITE AREAS.

RESPONSE TO COMMENT III.A.4, 3/18/88, P. 3:

THE ALLUVIAL SANDS AND SILTS WHICH COMPRISE THE WETLANDS ARE IN FACT THE HYDROSTRATIGRAPHIC EQUIVALENT OF THE SHALLOW AQUIFER ON SITE.

RESPONSE TO COMMENT III.B, 3/18/88, P. 3:

IT IS EPA POLICY TO USE AN EXCESS LIFETIME CANCER RISK LEVEL OF 10-6 WHERE APPLICABLE. AS STATED IN EPA'S ADDENDUM DATED 2/18/88, "IN THIS CASE, IT IS RECOMMENDED THAT A 10-5 EXCESS RISK IS APPROPRIATE BECAUSE 1) HOME WELLS HIGHLY LIKELY TO BE DRAWING FROM THE AQUIFER OF CONCERN ARE UPGRADIENT OF THE SITE, 2) HOME WELLS CURRENTLY DOWNGRADIENT OF THE SITE ARE A SIGNIFICANT DISTANCE AWAY AND ARE NOT KNOWN AT THIS TIME TO DRAW FROM THE AQUIFER OF CONCERN AND 3) DEVELOPMENT OF HOME WELLS IMMEDIATELY DOWNGRADIENT OF THE SITE IN THE NEAR FUTURE IS NOT LIKELY.".

RESPONSE TO COMMENT III.C, 3/18/88, P. 3:

IN THE FUTURE RISK SCENARIO "POSSIBLE LOCATION" INCLUDES ON-SITE LOCATIONS (I.E., WITHIN THE SITE BOUNDARIES) NOT ONLY LOCATIONS AT THE SITE BOUNDARIES.

SUMMARY OF RF&P RAILROAD COMPANY
MARCH 22ND COMMENTS AND EPA RESPONSES

RESPONSE TO COMMENT A.1, 3/22/88, P. 1:

SURFACE WATER AND GROUNDWATER SAMPLING DATA IS AVAILABLE FROM PREVIOUS PRIVATE CONSULTING AND AGENCY STUDIES DATING BACK TO THE EARLY 1980'S (SEE SECTION 1.3.2) INCLUDING NUMEROUS SAMPLING EVENTS ON THE 24 MONITOR WELLS INSTALLED BY CONSULTANTS FOR L.A. CLARKE AND AN EPA SITE INVESTIGATION CONDUCTED BY NUS CORPORATION (FIT III) IN 1983. THE COMBINED DATA FROM THESE STUDIES REFLECT "TEMPORAL AND SEASONAL VARIATION" IN SURFACE WATER/GROUNDWATER QUALITY AND CONTAMINANT MIGRATION RATES. BECAUSE OF THE VARYING LEVELS OF QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) ASSOCIATED WITH THE DATA, THE CURRENT QUESTIONABLE CONDITION OF THE EXISTING WELLS, AND THE ABSENCE OF BACKGROUND GROUNDWATER QUALITY DATA, EPA REGION III DECIDED TO INSTALL ALIMITED NUMBER OF MONITOR WELLS TO VERIFY THE EXISTING POOL OF INFORMATION. COMPARISON OF THE RESULTS FROM THE SINGLE SAMPLING EVENT ON THE EPA WELLS WITH HISTORICAL DATA IS FELT TO BE SUFFICIENT TO CHARACTERIZE GROUNDWATER AND SURFACE WATER CONTAMINANT CONDITIONS.

WHILE SEASONAL AND OTHER FACTORS MAY CAUSE VARIABILITY IN THE ABSOLUTE CONCENTRATIONS OF PNAS IN SURFACE WATERS AT THE SAME LOCATIONS AT DIFFERENT TIMES, THE RI DATA REVEALS CONSISTENTLY HIGHER PNA CONCENTRATIONS IN SURFACE WATERS ON-SITE.

RESPONSE TO COMMENT A.2, 3/22/88, P. 1, 2:

THE EXTENT OF SURFACE SOIL CONTAMINATION IS DETAILED IN THE EXTENSIVE CONTAMINANT DEPTH PROFILES TABLE FOUND IN APPENDIX B.

VISUAL AND ANALYTICAL DATA FROM THE OVER 100 TEST PITS, TRENCHES AND BORINGS COMPLETED DURING THE RI COMBINED WITH HISTORICAL INFORMATION (CONFIRMED DURING THE RI) ON PAST DISPOSAL PRACTICES OVER THE PAST 40 YEARS INDICATE THE PRESENCE OF NUMEROUS SCATTERED, ISOLATED POCKETS OF FREE-PHASE CREOSOTE, RANDOMLY DISTRIBUTED IN THE UNSATURATED ZONE. CONSIDERING SOME OF THESE DEPOSITS DATE BACK TO 1953 (WASTE PONDS NORTH OF THE FACILITY) AND ARE STILL PRESENT, THERE IS LITTLE DOUBT THAT CREOSOTE AND RELATED BY-PRODUCTS REMAIN AS A RELATIVELY CONSTANT SOURCE IN THE UNSATURATED ZONE FOR PERIODS OF 20 YEARS OR MORE. OWING TO THIS CONSTANT SOURCE OVER A PROLONGED PERIOD, MONITORING OF DOWNGRADIENT WELLS ADEQUATELY DEFINES CONTAMINANT RATE IN RELATION TO GROUNDWATER TRANSPORT WHICH IS A MAIN MECHANISM OF CONCERN IN THIS STUDY.

VERTICAL PROFILES OF CONTAMINATION EXTENT ARE PROVIDED IN APPENDIX B. THE PROGRAM APPROACH CONCENTRATED ON IDENTIFICATION AND VERIFICATION OF "SOURCES" (BASED ON AIR PHOTOS, INTERVIEWS, FIELD OBSERVATIONS) WHICH RESULTED IN CLUSTERING OF TEST PITS AND THE LIKE RATHER THAN A SYSTEMATIC GRIDDING OF THE SITE. WHILE GRIDDING MAY HAVE BEEN MORE CONDUCIVE TO CONTOUR MAPPING, IT WOULD NOT HAVE BEEN AS EFFECTIVE IN DELINEATING SOURCE AND DISTRIBUTION.

RESPONSE TO COMMENT A.3, 3/22/88, P. 2:

AS STATED IN THE RESPONSE TO COMMENTS 1 AND 2, GROUNDWATER CONDITIONS ARE FELT TO BE ADEQUATELY UNDERSTOOD BASED ON THE VOLUME OF HISTORICAL DATA AVAILABLE AND THE LONG-TERM PRESENCE OF THE CONTAMINANTS IN THE SUBSURFACE.

THE MULTIPLICITY OF SOURCES VERIFIED IN THE RI IN COMBINATION WITH THEIR ASSOCIATED "DRIVING" MECHANISM (I.E., CREOSOTE BELOW THE WATER TABLE PRODUCES A CONSTANT PLUME WHILE DISSOLUTION OF PRODUCT BY INFILTRATION IN THE UNSATURATED ZONE PRODUCES INTERMITTENT ENCLAVES OR PULSES OF CONTAMINATION) CIRCUMVENT "PLUME" CHARACTERIZATION FOR ANY ONE PARTICULAR AREA.

DATA FROM EXISTING WELLS LOCATED BETWEEN THE PROCESS FACILITY AND THE LAGOON/SOIL PILE SHOWED HIGH LEVELS OF PNAS. FREE-PHASE PRODUCT WAS FOUND ON TWO OCCASIONS AT THE BOTTOM OF ONE OF THE SHALLOW WELLS IN THIS AREA.

RESPONSE TO COMMENT A.4, 3/22/88, P. 3:

CONCENTRATIONS OF CPNAS IN SOILS, SURFACE WATER, SEDIMENT AND GROUNDWATER HAVE BEEN DETERMINED, AND THESE RESULTS HAVE BEEN INCORPORATED INTO THE PHE.

RESPONSE TO COMMENT A.5, 3/22/88, P. 3:

TOTAL PNA CONCENTRATION CONTOURS HAVE BEEN ESTIMATED FROM THE CONTAMINANT DEPTH PROFILE DATA FOUND IN APPENDIX B, THOUGH NOT ILLUSTRATED. BENZENE PROFILES HAVE BEEN EVALUATED BY SUPERIMPOSING BENZENE DATA ON THE CONTAMINANT DEPTH PROFILE TABLE.

RESPONSE TO COMMENT A.6, 3/22/88, P. 3:

THE MODELS PRESENTED IN THE PUBLIC HEALTH EVALUATION PROVIDE THE ANALYSIS OF OFF-SITE CONTAMINANT MIGRATION RATES SUGGESTED BY THE COMMENT.

RESPONSE TO COMMENT A.7, 3/22/88, P. 3:

THE CREOSOTE LAYER HAS BEEN CHEMICALLY CHARACTERIZED AND ITS DEPTH FROM THE SURFACE AND THICKNESS HAVE BEEN ESTIMATED. HYDROLOGICAL CHARACTERISTICS WILL BE ESTIMATED AS NECESSARY DURING THE TREATABILITY STUDY PHASE OF THIS PROJECT.

RESPONSE TO COMMENT A.8, 3/22/88, P. 4:

EPA AGREES THAT SURFACE WATER DOES NOT APPEAR TO BE A PRIMARY MIGRATION PATHWAY AND THAT CONTAMINANT LEVELS DECREASE SIGNIFICANTLY WITHIN A RELATIVELY SHORT DISTANCE OF THE SITE OUTFALLS. REGARDING ATTENUATION MECHANISMS, SEE RESPONSE TO COMMENT B.2.

RESPONSE TO COMMENT A.9, 3/22/88, P. 4:

THE DIFFERENT MIGRATION RATES FOR TPNAS AND CPNAS IS ACCOUNTED FOR IN THE PHE THROUGH THE USE OF DIFFERENT PARTITION COEFFICIENTS (KD) FOR THE TWO DIFFERENT GROUPS (APPENDICES L AND M).

RESPONSE TO COMMENT A.10, 3/22/88, P. 4, 5:

BASED ON THE RI/FS PHENOL RESULTS ALONE, IT IS AGREED THAT A CONCLUSION OF "NOT DETECTED" WOULD BE APPROPRIATE BASED UPON STRICT CLP DEFINITIONS AND THE RI/FS ROUND OF RESIDENTIAL WELL SAMPLING ALONE, HOWEVER, THE SIMILAR RESULTS OBTAINED BY OTHER AGENCIES WARRANT THE NOTING OF THE LOW LEVELS.

RESPONSE TO COMMENT B.1, 3/22/88, P. 5:

INSTITUTIONAL CONTROLS SUCH AS VIRGINIA'S LAW CONCERNING MINIMUM CASING REQUIREMENTS FOR WELLS ARE PRESENTLY A TOPIC OF AGENCY DEBATE. THE DEBATE CENTERS ON WHETHER SUCH CONTROLS PRECLUDE PROTECTION OF THE SHALLOW AQUIFER.

UNTIL GUIDANCE OR POLICY IS ESTABLISHED, THE GOAL OF PROTECTING THE SHALLOW AQUIFER CANNOT BE IGNORED.

THE REVIEWERS OVERLOOK THE CURRENT USE SCENARIO EXPOSURE TO WORKERS UNDER WHICH UPPER BOUND EXCESS LIFETIME CANCER RISKS OF 1 X 10-5 AND 3 X 10-3 ARE ESTIMATED FOR THE AVERAGE AND PLAUSIBLE MAXIMUM CASES. THESE RISKS MAY BE UNDERESTIMATED BY AS MUCH AS A FACTOR OF 10 SINCE THEY DO NOT INCLUDE THE SKIN CANCER RISKS ASSOCIATED WITH PNAS, NOR DO THEY INCLUDE POTENTIAL HEALTH EFFECTS ASSOCIATED WITH NON-CARCINOGENIC PNAS.

SIMILARLY, THE REVIEWERS OVERLOOK THE PLAUSIBLE MAXIMUM RISK FROM FISH INGESTION WHICH IS 10-3. STUDIES OF AQUATIC LIFE IN THE MASSAPONAX (TABLE 4-18) INDICATE NUMEROUS EDIBLE FISH SPECIES INCLUDING BLUEGILL, BASS, PERCH, AND PICKEREL IN THE MASSAPONAX. THEREFORE, AN ASSESSMENT OF THE RISKS FROM FISH INGESTION IS APPROPRIATE.

WITH RESPECT TO ASSESSMENT OF THE SHALLOW AQUIFER, IT IS NOT CLEAR WHY A SINGLE SAMPLING EVENT IS NOT ACCEPTABLE TO THE REVIEWERS FOR SHALLOW GROUNDWATER, WHEREAS A SINGLE SAMPLING EVENT IS ACCEPTABLE FOR SURFACE WATER OR THE DEEPER AQUIFERS. CLEARLY, ADDITIONAL SAMPLING WOULD PROVIDE GREATER CERTAINTY TO THE RISK ASSESSMENT. HOWEVER, THE DATA USED IN THE ASSESSMENT ARE VALID RESULTS, AND ARE REASONABLE CONSIDERING THE HIGH LEVEL OF SOIL CONTAMINATION. WE HAVE ASSUMED THAT THE SHALLOW AQUIFER CONTAMINATION IS EXTENSIVE IN BOTH AREAL EXTENT AND DEPTH, THIS IS REASONABLE GIVEN THE EXTENT OF SOIL CONTAMINATION. CONSEQUENTLY, THERE SHOULD NOT BE ANY DILUTION EFFECT FROM A PUMPING WELL.

BENZENE CONCENTRATIONS PREDICTED FOR THE DEEP AQUIFER ARE PREDICTED FOR 1 TO 100 YEARS FROM THE PRESENT. THE FACT THAT CONTAMINANTS ARE NOT CURRENTLY IN THE DEEP AQUIFER, THEREFORE, DOES NOT INVALIDATE THE MODEL.

RESPONSE TO COMMENT B.2, 3/22/88, P. 5:

SEE RESPONSE TO MARCH 18TH COMMENT II.A.1.

AS STATED ON PAGE 5-7 OF THE PHE, CREOSOTE CONTAINS HUNDREDS OF ORGANIC COMPOUNDS ONLY A SMALL SUBSET OF WHICH ARE PNAS ON THE HAZARDOUS SUBSTANCE LIST (HSL). OF PARTICULAR CONCERN AMONG THE CREOSOTE COMPONENTS NOT ON THE HSL ARE CARBAZOLE AND OTHER NITROGENOUS ORGANICS WHICH ARE THEMSELVES CARCINOGENIC OR WHICH MAY INTERACT SYNERGISTICALLY WITH THE POTENT CARCINOGENIC BENZO(A)PYRENE. CONSEQUENTLY, THE UV SCREENING CANNOT BE SAID TO OVERESTIMATE THE CONCENTRATIONS OF PNAS SIMPLY BECAUSE IT DOES NOT CORRESPOND TO THE HSL ANALYSES.

OF THE FOUR ATTENUATION MECHANISMS FOR PNAS LISTED BY THE REVIEWERS, VOLATILIZATION IS NOT CONSIDERED BY CALLAHAN ET AL. (1979) AS AN IMPORTANT MECHANISM. CALLAHAN ALSO NOTES THAT BIODEGRADATION FOR PNAS OF GREATER THAN 4 RINGS (WHICH INCLUDES THE CPNAS) IS A SLOW MECHANISM. ADSORPTION CANNOT BE CONSIDERED A COMPLETE ATTENUATION PROCESS BECAUSE SEDIMENTATION MAY BE RESUSPENDED AND TRANSPORTED DOWNSTREAM, AND BECAUSE CONTAMINANTS IN SEDIMENTS MAY ENTER THE FOOD CHAIN THROUGH BENTHICS AND BOTTOM FEEDERS. ONLY PHOTOLYSIS MAY RESULT IN ANY SIGNIFICANT BREAKDOWN OF PNAS, HOWEVER NO RELIABLE LITERATURE VALUES ARE AVAILABLE TO INCORPORATE PHOTOLYSIS INTO THE SURFACE WATER TRANSPORT MODEL.

CONSEQUENTLY, NOT INCLUDING THESE MECHANISMS IN THE TRANSPORT MODEL MAY RESULT IN SOME OVERESTIMATION (AS NOTED IN SECTION 5.5.3, RISK ASSESSMENT UNCERTAINTIES); HOWEVER, THE LEVEL OF OVERESTIMATION DOES NOT INVALIDATE THE ANALYSIS. THE MODEL PREDICTIONS ARE BORN OUT BY THE SAMPLING RESULTS FROM THE RI. THE REVIEWERS OVERLOOK THE FIRST PREDICTION OF SURFACE WATER CONCENTRATIONS LISTED IN TABLE 5-3 WHICH PREDICTS PNA LEVELS BETWEEN 0.057 UG/L AND 5.8 UG/L WHICH ARE BELOW THE 10 UG/L DETECTION LIMIT FOR SAMPLES TAKEN FROM MASSAPONAX CREEK.

RESPONSE TO COMMENT B.3, 3/22/88, P. 6:

AS STATED ABOVE, THE LACK OF DETECTABLE PNAS IN SURFACE WATER DOES NOT INDICATE THAT PNAS ARE NOT LEAVING THE

SITE. PREDICTED ANNUAL AVERAGE CONCENTRATION FOR PNAS ARE BELOW DETECTION LIMITS. HIGHER LEVELS ARE UNDOUBTEDLY ENCOUNTERED DURING AND FOLLOWING PERIODS OF STORM RUNOFF. THE USE OF AVERAGE SOIL AND GROUNDWATER CONCENTRATIONS MAY OVERESTIMATE LOADING RATES SINCE SAMPLES WERE MAINLY COLLECTED FROM CONTAMINATED AREAS. HOWEVER, THE SAMPLING EFFORT WAS SUFFICIENTLY EXTENSIVE THAT THIS OVERESTIMATION IS NOT BELIEVED TO BE VERY GREAT.

RESPONSE TO COMMENT B.4, 3/22/88, P. 7:

AS STATED IN RESPONSE TO COMMENT B.1, IT IS NOT CLEAR WHY THE REVIEWERS ACCEPT THE RESULTS OF SINGLE SAMPLES FOR THE DEEP AQUIFER AND SURFACE WATER BUT NOT FOR THE SHALLOW GROUNDWATER.

IN ANY CASE, THE SHALLOW GROUNDWATER SAMPLES ARE VALID RESULTS AND THEY ARE REASONABLE GIVEN THE LEVEL OF SOIL CONTAMINATION. THE MODEL PREDICTS CONCENTRATIONS IN THE DEEPER AQUIFER AT INTERVALS OF 1 TO 100 YEARS FROM THE PRESENT. THEREFORE, THE LACK OF DETECTABLE BENZENE IN THE DEEPER AQUIFER DOES NOT INVALIDATE THE MODEL.

RESPONSE TO COMMENT B.5, 3/22/88, P. 7, 8:

TABLE 4-18 IDENTIFIES SEVERAL EDIBLE FISH SPECIES OBSERVED IN THE MASSAPONAX CREEK. MANY OF THESE SPECIES INCLUDING LARGEMOUTH BASS, BULLHEAD AND PERCH COULD EASILY BE EXPECTED TO REACH SIZES OF ONE TO TWO POUNDS. CONSEQUENTLY, IT WOULD NOT BE DIFFICULT FOR A MAXIMALLY EXPOSED INDIVIDUAL TO OBTAIN THE 5.2 POUNDS OF FISH PER YEAR USED AS THE FISH CONSUMPTION RATE IN THE RISK ASSESSMENT.

RESPONSE TO COMMENT C.1, 3/22/88, P. 8:

SEE RESPONSE TO COMMENT B.2.

RESPONSE TO COMMENT C.2, 3/22/88, P. 8:

THE RISK ASSESSMENT PRESENTED IN THE PUBLIC HEALTH EVALUATION PROBABLY DOES OVERESTIMATE RISK. THIS WAS STATED IN SEVERAL AREAS OF THE REPORT. THE OVERESTIMATION IS DUE TO CONSERVATIVE ASSUMPTIONS WHICH ARE USED TO PLACE UPPER BOUNDS ON AREAS OF UNCERTAINTY. THIS PRACTICE IS CLEARLY BASED ON EPA POLICY AND GUIDANCE ON RISK ASSESSMENTS CONDUCTED AT SUPERFUND SITES.

RESPONSE TO COMMENT C.3, 3/22/88, P. 8:

CLEANUP LEVELS ACCOUNT FOR POTENTIAL CURRENT AND FUTURE EXPOSURE PATHWAYS AS IDENTIFIED IN THE PUBLIC HEALTH EVALUATION. WITHOUT INFORMATION ON THE QUANTITIES OF MATERIAL ORIGINALLY DISPOSED OF AT THE SITE AND THE RATE OF DISPOSAL, OR TIME-DEPENDENT MONITORING, DEGRADATION RATES CANNOT BE INCLUDED IN THE DEVELOPMENT OF CLEANUP LEVELS.

RESPONSE TO COMMENT C.4, 3/22/88, P. 9:

WE AGREE THAT THE REFERENCE TO INORGANIC CONTAMINANTS ON PAGE 6-18 SHOULD BE OMITTED.

RESPONSE TO COMMENT D.1, 3/22/88, P. 9:

THE ESTIMATED VOLUMES OF CONTAMINATED SOILS, SEDIMENTS, CREOSOTE LAYER AND BURIED PIT MATERIALS ARE SUFFICIENT TO ALLOW FS ANALYSIS AND COST ESTIMATION.

RESPONSE TO COMMENT D.2, 3/22/88, P. 9:

THE EXISTING DATA IS ACCURATE AND SUFFICIENT TO ALLOW COST EVALUATION OF FS ALTERNATIVES.

RESPONSE TO COMMENT D.3, 3/22/88, P. 9:

IT IS AGREED THAT A PHASED APPROACH TO ALTERNATIVE 3 IS EFFICIENT AND COST EFFECTIVE. A PHASED APPROACH BEGINNING WITH TREATABILITY STUDIES IS PLANNED. THE OFF-SITE DISPOSAL AND TREATMENT ALTERNATIVES WERE INCLUDED, IN PART, TO (1) PUT OTHER ALTERNATIVES INTO COST PERSPECTIVE, (2) ANSWER THE QUESTION, "HOW MUCH WOULD IT COST TO SIMPLY REMOVE THE CONTAMINATION FROM SITE", AND (3) COMPLY WITH THE CERCLA REQUIREMENT OF EVALUATING AN OFF-SITE ALTERNATIVE.

RESPONSE TO COMMENT D.4, 3/22/88, P. 9:

AIR MONITORING WILL BE CONDUCTED DURING THE REMEDIAL ACTION TO ENSURE THAT THE ODORS AT THE SITE DO NOT EXCEED STATE RULES AND REGULATIONS. IF ODORS ARE DETECTED AT LEVELS EXCEEDING THE STATE REGULATIONS, ACTIVITIES AT THE SITE WILL BE STOPPED UNTIL THE PROBLEM IS CORRECTED.

RESPONSE TO COMMENT E.1.A, 3/22/88, P. 10:

THE RESIDENTIAL WELLS IDENTIFIED DURING THE RI/FS DRAW FROM THE SHALLOW AQUIFER UPGRADIENT OF THE SITE AND PRESENTLY DO NOT SHOW CONTAMINATION RELATED TO L. A. CLARKE.

RESPONSE TO COMMENT E.1.B, 3/22/88, P. 10:

DATA FROM ON-SITE WELLS INTO THE SHALLOW AND DEEP AQUIFERS SHOWS THAT THERE IS PRESENTLY NO DEGRADATION OF THE LOWER WATER BEARING ZONE IMMEDIATELY BELOW THE STUDY AREA. FUTURE GROUNDWATER QUALITY CONDITIONS ARE SPECULATIVE, AT BEST.

RESPONSE TO COMMENT E.1.C, 3/22/88, P. 10:

SEE RESPONSE TO COMMENT B.1, 3/22/88.

RESPONSE TO COMMENT E.1.D, 3/22/88, P. 10:

THE USE OR NON-USE OF AN AQUIFER AS FUTURE SOURCE OF DRINKING WATER WOULD NOT BE BASED SOLELY ON DOWNGRADIENT AQUIFER CHARACTERISTICS (I.E., SATURATED THICKNESS).

RESPONSE TO COMMENT E.1.E, 3/22/88, P. 10:

SEE RESPONSE TO COMMENT B.1.

RESPONSE TO COMMENT E.1.A AND E.1.B, 3/22/88, P. 11:

IT IS EPA POLICY TO USE AN EXCESS CANCER RISK LEVEL OF 10-6 WHERE APPLICABLE, FOR THE REASONS DETAILED IN THE RESPONSE TO THE MARCH 18, III.B COMMENT A RISK LEVEL OF 10-5 HAS BEEN CHOSEN.

AIR STANDARDS ARE NOT APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS WHERE GROUNDWATER CONTAMINATION IS CONCERNED. EPA'S AIR STANDARDS ARE NOT RISK BASED. THE RISK OF 10-4 ASSOCIATED WITH BENZENE UNDER THE NESHAPS PROGRAM IS A RESIDUAL RISK REMAINING AFTER THE REGULATION IS APPLIED, NOT A GOAL OF THE REGULATION. A 10-5 OR 10-6 RISK LEVEL IS MORE IN KEEPING WITH STANDARDS FOR GROUNDWATER SUCH AS THE MCL. WHILE THE INPUT PARAMETERS TO THE MODEL ARE CONSERVATIVE, THEY ARE NOT OVERLY CONSERVATIVE GIVEN THE AVAILABLE DATA. PARAMETERS SUCH AS ORGANIC CARBON CONTENT, HYDRAULIC CONDUCTIVITY, AND POLARITY ARE DERIVED FROM ANALYSES PERFORMED AT THE SITE.

RESPONSE TO COMMENT E.1.C, 3/22/88, P. 11:

RISKS ASSOCIATED WITH THE PLAUSIBLE MAXIMUM CASES WERE ON THE ORDER OF 10-3 TO 10-6.

RESPONSE TO COMMENT E.1.D, 3/22/88, P. 11:

THE PLAUSIBLE MAXIMUM CASES ARE BASED ON THE UPPER 95% CONFIDENCE LIMIT OF THE GEOMETRIC MEAN SOIL CONCENTRATIONS. MANY AREAS OF THE SITE EXHIBIT CONTAMINANT CONCENTRATIONS HIGHER THAN THESE VALUES, SUGGESTING THAT UNDER SOME CIRCUMSTANCES RISKS COULD BE EVEN HIGHER. THE MODEL INPUT PARAMETERS ARE BY NO MEANS ARBITRARY. THEY ARE BASED ON INFORMATION GATHERED FROM EXTENSIVE FIELD WORK AT THE SITE. CONSERVATIVE ASSUMPTIONS HAVE BEEN USED IN ORDER TO PLACE AN UPPER BOUND ON AREAS OF UNCERTAINTY.

RESPONSE TO COMMENT E.2, 3/22/88, P. 11:

IN THE FUTURE RISK SCENARIO, "POSSIBLE LOCATION" INCLUDES ON-SITE LOCATIONS (I.E., WITHIN THE SITE BOUNDARIES) NOT ONLY LOCATIONS AT THE SITE BOUNDARIES.

THE FOLLOWING ARE ADDITIONAL RESPONSES TO COMMENTS SUBMITTED BY REPRESENTATIVES OF RICHMOND, FREDERICKSBURG & POTOMAC RAILROAD:

GENERAL COMMENT:  THE VALIDITY OF TARGET CLEANUP LEVELS FOR THE SITE IS QUESTIONABLE.

RESPONSE:  THE PUBLIC HEALTH EVALUATION HAS FOUND THE NO ACTION ALTERNATIVE IS NOT PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. TARGET CLEANUP LEVELS HAVE BEEN ESTABLISHED TO ACHIEVE SUCH PROTECTION. AS INDICATED IN THE REMEDIAL ACTION OBJECTIVES SECTION OF THE ROD, THESE TARGET CLEANUP LEVELS SHALL BE CONFIRMED VIA STUDIES IN THE REMEDIAL DESIGN PHASE.

RESPONSE TO COMMENT D.3, 3/22/88, P. 9:

THE DESCRIPTION OF THE RECOMMENDED ALTERNATIVE PROVIDES THAT SOME SOILS MAY BE LAND FARMED IN PLACE.  IT IS ALSO STATED THAT WHERE MATERIALS CANNOT BE LAND TREATED IN PLACE, THEY MUST BE EXCAVATED FOR TREATMENT. STUDIES DURING THE REMEDIAL DESIGN SHALL DETERMINE WHICH SOILS CAN BE TREATED IN PLACE AND WHICH SOILS MUST BE EXCAVATED FOR TREATMENT IN THE LANDFARM.  IN ALL CASES, TREATMENT MUST REACH CONFIRMED TARGET CLEANUP LEVELS WHICH ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

RESPONSE TO COMMENT B.1, 3/22/88, P. 5:

THE SHALLOW AQUIFER OF CONCERN IS HIGHLY LIKELY TO BE THE SOURCE OF WATER FOR AT LEAST THREE HOME WELLS (SEE RI/FS ADDENDUM OF 2/18/88) WITHIN 2000 FEET OF THE SITE.  TWO OF THESE ARE DUG WELLS AND ARE AN ESTIMATED 1000 FEET FROM THE SITE.  THE THIRD IS WITHIN AN ESTIMATED 2000 FEET AND IS A RECENTLY DRILLED WELL WHICH APPARENTLY MEETS THE VIRGINIA REGULATIONS OF CONCERN.  ADDITIONAL RESIDENTIAL WELLS WITHIN ONE-HALF MILE OF THE SITE MAY CURRENTLY BE TAPPING THIS AQUIFER.  FUTURE RESIDENTIAL WELLS WITHIN ONE HALF MILE OF THE SITE MAY TAP THIS AQUIFER. BASED ON THIS INFORMATION, EPA HAS DETERMINED THAT THE AQUIFER OF CONCERN SHOULD BE PROTECTED FOR DRINKING WATER PURPOSES.

RESPONSE TO COMMENT E.1.A, 3/22/88, P. 10:

THOUGH UPGRADIENT FROM THE SITE, THERE APPEARS TO BE, AT A MINIMUM, AT LEAST ONE RESIDENTIAL WELL WITHIN AN ESTIMATED 2000 FEET OF THE SITE WHICH MEETS CURRENT VIRGINIA REGULATIONS AND DRAWS WATER FROM THE SHALLOW AQUIFER OF CONCERN.  BASED ON THIS AND OTHER INFORMATION (SEE TO COMMENT B.1 ABOVE), EPA HAS DETERMINED THAT THE AQUIFER OF    CONCERN SHOULD BE PROTECTED FOR DRINKING WATER PURPOSES.

## L. A. CLARKE & SONS SITE
## ADMINISTRATIVE RECORD * **
## INDEX OF DOCUMENTS

SITE IDENTIFICATION
BACKGROUND

1) REPORT:  CONTRACT V83512, GEOTECHNICAL ENGINEERING AND GROUNDWATER HYDROLOGY STUDY FOR L. A. CLARKE, INC., BY SCHNABEL ENGINEERING ASSOCIATES, 12/18/84.  P. 1-167.

2) HAZARDOUS WASTE PERMIT APPLICATION, 9/10/82.  P. 168-171.

3) HAZARDOUS WASTE PERMIT APPLICATION (UNDATED).  P. 172-176.

PA/SI REPORTS

1) REPORT:  SITE INSPECTION OF L. A. CLARKE & SONS, PREPARED UNDER TDD NO. F3-8304-04, BY NUS CORPORATION, 5/21/84.  P. 1-286.

2) REPORT:  L. A. CLARKE SITE, FREDERICKS (SIC), VIRGINIA, INITIAL SITE INSPECTION MEMO, 8/26/85.  P. 287-320.

* ADMINISTRATIVE RECORD AVAILABLE 2/1/88, UPDATED 2/18/88.

** SUPPORTING SAMPLING DATA IS STORED AT THE EPA REGION III CENTRAL REGIONAL LABORATORY IN ANNAPOLIS, MARYLAND.

REMEDIAL ENFORCEMENT PLANNING
POTENTIALLY RESPONSIBLE PARTY SEARCH

1) LETTER TO MR. MARK CURTAS FROM MR. STEPHEN R. WASSERSUG RE: INFORMATION REQUEST, 12/84. P. 1-4. A RECEIPT FOR REGISTERED MAIL IS ATTACHED TO THE LETTER.

2) LETTER TO MR. JOHN J. NEWBAUER FROM MR. STEPHEN R. WASSERSUG RE: INFORMATION REQUEST, 12/24/84. P. 5-7.

3) LETTER TO MS. EMILY S. CHOW FROM MS. SUSAN H. PIERCE RE: INFORMATION IN COMPLIANCE WITH MR. STEPHEN WASSERSUG'S LETTER OF DECEMBER 24, 1984 TO MR. JOHN J. NEWBAUER, 1/15/85. P. 8-14. TWO LEASES ARE ATTACHED TO THE LETTER.

4) LETTER TO MR. MARK CURTAS FROM MR. STEPHEN R. WASSERSUG RE: INFORMATION REQUEST, 3/4/85. P. 15-17B. RECEIPTS FOR REGISTERED MAIL ARE ATTACHED TO THE LETTER.

5) LETTER TO MR. JOHN J. NEWBAUR (SIC) FROM MR. STEPHEN R. WASSERSUG RE: INFORMATION REQUEST, 3/4/85. P. 18-20B. RECEIPTS FOR REGISTERED MAIL ARE ATTACHED TO THE LETTER.

6) LETTER TO MS. MARY COE FROM MS. SUSAN H. PIERCE RE: REMEDIAL INVESTIGATION AND FEASIBILITY STUDY, 5/10/85. P. 21-23. A MEMORANDUM REGARDING THE COMPLETION OF THE POTENTIALLY RESPONSIBLE PARTY SEARCH IS ATTACHED TO THE LETTER.

REMEDIAL RESPONSE PLANNING
WORK PLANS

1) REPORT: WORK PLAN FOR L. A. CLARKE & SONS, INC., FREDERICKSBURG, VIRGINIA, REMEDIAL INVESTIGATION/FEASIBILITY STUDY, 11/1/85. P. 1-176.

2) REPORT: PROJECT OPERATIONS PLAN, HEALTH AND SAFETY PLAN FOR L. A. CLARKE SITE, SPOTSYLVANIA COUNTY, FREDERICKSBURG, VIRGINIA, REMEDIAL INVESTIGATION/FEASIBILITY, 4/25/86. P. 177-235.

3) MEMORANDUM TO MS. LISA LOWE FROM MR. RALPH M. SHAPOT RE: L. A. CLARKE RESCOPING ACTIVITY - REVISIONS TO POP, 4/3/86. P. 236-256. THE FOLLOWING ARE ATTACHED TO THE MEMORANDUM:

   A) ACTIVITY NO. 2 - AIR SAMPLING,
   B) ACTIVITY NO. 4 - SELECT/SAMPLE MONITORING WELLS,
   C) ACTIVITY NO. 5 - NEW MONITORING WELL INSTALLATION,
   D) ACTIVITY NO. 11 - SURFACE WATER/SEDIMENTS SAMPLING.

4) LETTER TO MR. DON KANE FROM MR. RALPH M. SHAPOT RE: L. A. CLARKE SITE SAMPLING COORDINATION, 4/23/86. P. 257-264. A SURFACE WATER/SEDIMENT SAMPLING PLAN FOR L. A. CLARKE IS ATTACHED TO THE LETTER.

5) LETTER TO MR. ROBERT GREAVES FROM MR. DAVID C. MUNTZ RE: PROPOSED CLOSURE PLAN AND THE POST CLOSURE CARE AND GROUNDWATER MONITORING PLAN FOR L. A. CLARKE, INC., 8/11/86. P. 265-334. THE FOLLOWING ARE ATTACHED TO THE LETTER:

   A) THE CLOSURE PLAN,
   B) THE POST CLOSURE AND GROUNDWATER MONITORING PLAN,
   C) THE COMPREHENSIVE ENVIRONMENTAL CLEANUP AND HAZARDOUS WASTE FACILITY CLOSURE PLAN.

6) MEMORANDUM TO MR. A. SZILAGZI AND MR. L. WININGER FROM MR. R. M. SHAPOT RE: PHASE II SITE WORK AT THE L. A. CLARKE SITE, 8/20/86. P. 335-341. THE PHASE II ANALYSIS AND A SITE PROTECTION & SAFETY EVALUATION FORM ARE ATTACHED TO THE MEMORANDUM.

RI/FS REPORTS

1) REPORT: DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR L. A. CLARKE SITE, FREDERICKSBURG, VIRGINIA, VOLUME I, BY ROY F. WESTON, INC., 10/87. P. 1-447.

2) REPORT: DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR L. A. CLARKE SITE, FREDERICKSBURG, VIRGINIA, VOLUME II, BY ROY F. WESTON, INC., 10/87. P. 448-1291.

3) REPORT: FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR L. A. CLARKE SITE, FREDERICKSBURG, VIRGINIA, VOLUME I, BY ROY F. WESTON, INC., 2/88. P. 1292-1737.

4) REPORT: FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR L. A. CLARKE SITE, FREDERICKSBURG, VIRGINIA, VOLUME II, BY ROY F. WESTON, INC., 2/88. P. 1738-2455.

5) MEMORANDUM TO THE FILE FROM MR. DARIUS OSTRAUSKAS RE: ADDENDUM TO THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY, 2/18/88. P. 2456-2498.

CORRESPONDENCE

1) LETTER TO MR. DARIUS OSTRAUSKAS FROM MR. JOHN E. VARNUM RE: TRANSMITTAL OF DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY, 12/29/87. P. 1-12. COMMENTS CONCERNING THE DRAFT REPORT ARE ATTACHED TO THE LETTER.

2) LETTER TO MR. DARIUS OSTRAUSKAS FROM MR. JOHN E. VARNUM RE: TRANSMITTAL DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR L.A. CLARKE, 1/22/88. P. 12-16. A DOCUMENT DESCRIBING FLAWS IN THE DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY OF OCTOBER 1987 IS ATTACHED TO THE LETTER.

3) MEMORANDUM TO MR. ALAN HUMPHREY FROM MS. CAROL SIM RE: MICROTOX ANALYSIS FOR L. A. CLARKE & SONS SITE, 6/17/85. P. 17-29. A REPORT OF THE RESULTS IS ATTACHED TO THE MEMORANDUM.

4) MEMORANDUM TO MR. ROYALE NADEAU FROM MR. WILLIAM E. MILLER RE: L. A. CLARKE & SONS BIOASSAYS, 7/17/85. P. 30-31. A TABLE OF THE RESULTS IS ATTACHED TO THE MEMORANDUM.

5) LETTER TO MR. STEVEN T. FOSTER FROM MR. H. S. GILL RE: LABORATORY TEST RESULTS OF SAMPLES COLLECTED FROM WELLS IN SPOTSYLVANIA COUNTY, 10/3/85. P. 32-33. A CERTIFICATE OF THE ANALYSIS IS ATTACHED TO THE LETTER.

6) LETTER TO MR. STEVEN T. FOSTER FROM MR. RICHARD L. COOK RE: LABORATORY RESULTS FROM AIR SAMPLES TAKEN BY THE AIR POLLUTION CONTROL BOARD OF SPOTSYLVANIA COUNTY, 10/18/85. P. 34-37. A MAP OF SPOTSYLVANIA COUNTY IS ATTACHED TO THE LETTER.

7) LETTER TO MR. WILLIAM HAGEL FROM MR. L. KIMBALL PAYNE RE: RESULTS OF THE WELL TESTING DONE BY SPOTSYLVANIA COUNTY IN THE VICINITY OF THE L. A. CLARKE CREOSOTE PLANT, 10/28/85. P. 38-38.

8) LETTER TO MR. BILL HAGEL FROM MR. JERROLD SAMFORD RE: COMMENTS ON THE DRAFT WORK PLAN FOR THE L. A. CLARKE & SONS FACILITY, 11/13/85. P. 39-40.

9) LETTER TO MR. BILL HAGEL FROM MS. PAULINE M. EWALD RE: RELATIONSHIP BETWEEN WELL-WATER QUALITY AND THE L. A. CLARKE & SONS FACILITY, 12/9/85. P. 41-50. THE FOLLOWING ARE ATTACHED TO THE LETTER:

A) TWO CERTIFICATES OF ANALYSES,
B) TWO FIELD AND LABORATORY DATA FORMS,
C) WATER WELL COMPLETION REPORT.

10) MEMORANDUM TO MR. RAY GERMAN FROM MR. DAN CHELLARAJ RE: REVIEW AND COMMENTS ON L. A. CLARKE REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN, 1/13/86. P. 51-53. A MEMORANDUM REGARDING COMMENTS ON THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN IS ATTACHED TO THE MEMORANDUM.

11) MEMORANDUM TO MR. WILLIAM A. HAGEL FROM MR. RALPH M. SHAPOT RE: L. A. CLARKE RESCOPING CONSIDERATIONS, 3/12/86. P. 54-55.

12) MEMORANDUM TO MR. WILLIAM A. HAGEL FROM MR. RALPH M. SHAPOT RE: NOTES OF REFOCUSING PHASE I MEETING HELD ON MARCH 12, 1986, 3/13/86. P. 56-57.

13) RECORD OF PHONE CONVERSATION TO MS. LAURA BOORNAZIAN AND MR. JERRY SANFORD FROM MR. DON MESSINGER RE: SAMPLES FROM WELLS AT L. A. CLARKE SITE, 5/2/86. P. 58-60. A RECORD OF PHONE CONVERSATION REGARDING WASTE GENERATED ON L. A. CLARKE SITE AND A RECORD OF PHONE CONVERSATION REGARDING WASTE DISPOSAL ARE ATTACHED TO THE RECORD.

14) LETTER TO MS. LAURA BOORNAZIAN FROM MS. PAULINE M. EWALD RE: REVISIONS TO THE L. A. CLARKE WORK PLAN, 5/16/86. P. 61-62.

15) LETTER TO MR. RALPH SHAPOT FROM MS. ANNE KOPECKY RE: RESULTS FROM THE ECOVA PRELIMINARY FEASIBILITY STUDY PERFORMED ON SAMPLES FROM THE SITE, 10/3/86. P. 63-65. A TABLE OF PERCENT REDUCTION OF PNAS RESULTING FROM MICROBIAL ACTIVITY IS ATTACHED TO THE LETTER.

16) MEMORANDUM TO MS. LINDA BOORNAZIAN FROM MR. H. RONALD PRESTON RE: TOXICITY TEST RESULTS PERFORMED IN THE WHEELING BIOLOGY LAB ON SAMPLES FROM THE L. A. CLARKE SITE, 11/20/86. P. 66-68. A REPORT OF THE RESULTS IS ATTACHED TO THE MEMORANDUM.

17) MEMORANDUM TO MR. DON KANE AND MS. LINDA BOORNAZIAN RE: AQUATIC TOXICITY CONDUCTED ON SAMPLE COLLECTED FROM THE L. A. CLARKE SITE, 1/12/87. P. 69-81. A REPORT OF THE RESULTS IS ATTACHED TO THE MEMORANDUM.

18) LETTER TO MR. DARIUS OSTRAUSKAS FROM MR. JONATHAN D. HORIN RE: DRAFT FINAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR L. A. CLARKE SITE, 1/13/87. P. 82-88. A LETTER REGARDING THE NPDES PERMIT FOR L. A. CLARKE DISCHARGE, A LETTER REQUESTING APPROPRIATE REQUIREMENTS OF THE STATE AIR POLLUTION CONTROL BOARD (SAPCB) FOR SUPERFUND, AND A TABLE OF SAPCB RESPONSE TO REMEDIAL ALTERNATIVES ARE ATTACHED TO THE LETTER.

19) LETTER TO MS. LAURA BOORNAZIAN FROM MR. RALPH M. SHAPOT RE: BENCH-SCALE/PILOT STUDIES AT THE L. A. CLARKE SITE, 2/3/87. P. 89-162. THE FOLLOWING ARE ATTACHED TO THE LETTER:

A) TREATMENT TECHNIQUES ON IN-SITU SOIL FLUSHING,
B) TREATMENT TECHNIQUES ON SOIL WASHING,
C) TREATMENT TECHNIQUES ON SOLIDIFICATION,
D) A PROPOSAL FOR IN-SITU SOIL WASH INTEGRATED WITH IN-SITU BIORECLAMATION AND ENGINEERED BIORECLAMATION STUDIES.

20) REPORT: TREATABILITY STUDY APPROACH, BIORECLAMATION OF POLYNUCLEAR AROMATICS (PNAS) IN SOIL, L. A. CLARKE SITE, FREDERICKSBURG, VIRGINIA, BY CAMP DRESSER & MCKEE, 3/87. P. 163-226.

21) LETTER TO MS. LAURA BOORNAZIAN FROM MR. RALPH M. SHAPOT RE:

RECONNAISSANCE FOR PHASE III ACTIVITIES AT THE L. A. CLARKE SITE, 3/4/87. P. 227-229.

22) REPORT: UNION PACIFIC RAILROAD LARAMIE TIE TREATING PLAN, IN-SITU TREATMENT PROCESS DEVELOPMENT PROGRAM MILESTONE REPORT I, OVERVIEW REPORT, VOLUME I, 6/87. P. 230-286.

23) LETTER TO MR. DARIUS OSTRAUSKAS FROM MR. IRVINE ALPERT RE: LITERATURE ON THE SERVICES OFFERED FROM ECOVA CORPORATION, 11/25/87. P. 287-307. A PROJECT SUMMARY, A PROJECT OUTLINE AND A REPORT ENTITLED "PILOT-SCALE BIOREMEDIATION AT THE BRIO REFINING SUPERFUND SITE," ARE ATTACHED TO THE LETTER.

24) LETTER TO MR. STEPHEN R. WASSERSUG FROM MS. CYNTHIA V. BAILEY RE: CONSIDERATION OF A PROPOSAL TO CONSOLIDATE ALL RCRA/CERCLA ACTIONS AT THE L. A. CLARKE SITE, 12/15/87. P. 308-310.

25) LETTER TO MR. BRUCE SMITH FROM MR. K. C. DAS RE: DRAFT REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT ON THE L. A. CLARKE & SONS SITE, 1/28/88. P. 311-313.

EMERGENCY REMOVAL
TECHNICAL

1) MEMORANDUM TO MR. GERALD HESTON FROM MR. BHUPI KHONA RE: ORGANIC DATA REVIEW OF L. A. CLARKE, 8/9/85. P. 1-3. A MEMORANDUM REGARDING SAMPLING ASSESSMENT AND WOOD TREATMENT AND A MAP OF L. A. CLARKE SITE ARE ATTACHED TO THE MEMORANDUM.

2) MEMORANDUM TO MR. JERRY HESTON FROM MR. BHUPI KHONA RE: DIOXIN ANALYSIS FOR L. A. CLARKE, 10/28/85. P. 4-12. A LETTER AND A REPORT ON DIOXIN/DIBENZOFURAN ARE ATTACHED TO THE MEMORANDUM.

OPERATIONAL

1) MEMORANDUM TO MR. GERRY HESTON FROM MR. E. TERRY JENSEN RE: TRIP REPORT TO L. A. CLARKE SITE, 9/9/85. P. 1-4. A TABLE FOR SAMPLE LOCATION TO SAMPLE NUMBER AND A MAP OF L. A. CLARKE SITE ARE ATTACHED TO THE MEMORANDUM.

2) MEMORANDUM TO MR. CHARLES WALTERS FROM MR. STEPHEN MARGOLIS RE: IMMEDIATE REMOVAL OF CONTAMINATED MATERIAL, 11/14/85. P. 5-8.

3) MEMORANDUM TO MS. VICKIE PROVINCE FROM MS. MRINAL BISWAS RE: SITE ASSESSMENT FOR L. A. CLARKE SUPERFUND SITE, 1/20/87. P. 9-11.

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COMMUNITY RELATIONS PLAN

1) REPORT: FINAL COMMUNITY RELATIONS PLAN FOR THE L. A. CLARKE SITE, SPOTSYLVANIA COUNTY, VIRGINIA, 4/21/86. P. 1-27. A MAILING LIST IS ATTACHED TO THE REPORT.

FACT SHEETS, PRESS RELEASES, PUBLIC NOTICES

1) PRESS RELEASE FROM U.S. EPA ENVIRONMENTAL NEWS ENTITLED, "EPA APPROVES FUNDING FOR STUDY OF L. A. CLARKE SUPERFUND SITE," 7/16/85. P. 1-1.

2) PRESS RELEASE FROM U.S. EPA ENVIRONMENTAL NEWS ENTITLED, "EPA COMPLETES PLAN FOR STUDY OF L. A. CLARKE SUPERFUND SITE," 11/14/85. P. 2-2.

SITE SPECIFIC GUIDANCE DOCUMENTS *

21) "BIOREMEDIATION OF CONTAMINATION BY HEAVY ORGANICS AT A WOOD PRESERVING PLANT SITE," BY MR. RONALD J. LINKENHEIL AND MR. THOMAS J. PATNODE (UNDATED). P. 1-5.

22) "LAND TREATMENT OF WOOD PRESERVING WASTES," BY MR. JOHN R. RYAN AND MR. JOHN SMITH (UNDATED). P. 6-12.

*LOCATED IN U.S. EPA REGION III OFFICE.

GENERAL GUIDANCE DOCUMENTS *

1) "PROMULGATION OF SITES FROM UPDATES 1-4," FEDERAL REGISTER, DATED 6/10/86.

2) "PROPOSAL OF UPDATE 4," FEDERAL REGISTER, DATED 9/18/85.

3) MEMORANDUM TO U. S. EPA FROM MR. GENE LUCERO REGARDING COMMUNITY RELATIONS AT SUPERFUND ENFORCEMENT SITES, DATED 8/28/85.

4) GROUNDWATER CONTAMINATION AND PROTECTION, UNDATED BY MR. DONALD V. FELICIANO ON 8/28/85.

5) MEMORANDUM TO TOXIC WASTE MANAGEMENT DIVISION DIRECTORS REGIONS I-X FROM MR. WILLIAM HEDEMAN AND MR. GENE LUCERO RE: POLICY ON FLOODPLAINS AND WETLANDS ASSESSMENTS FOR CERCLA ACTIONS, 8/6/85.

6) GUIDANCE OF REMEDIAL INVESTIGATIONS UNDER CERCLA, DATED 6/85.

7) GUIDANCE ON FEASIBILITY STUDIES UNDER CERCLA, DATED 6/85.

8) "PROPOSAL OF UPDATE 3," FEDERAL REGISTER, DATED 4/10/85.

9) MEMORANDUM TO MR. JACK MCGRAW ENTITLED "COMMUNITY RELATIONS ACTIVITIES AT SUPERFUND SITES - INTERIM GUIDANCE," DATED 3/22/85.

10) "PROPOSAL OF UPDATE 2," FEDERAL REGISTER, DATED 10/15/84.

11) EPA GROUNDWATER PROTECTION STRATEGY, DATED 9/84.

12) MEMORANDUM TO U.S. EPA FROM MR. WILLIAM HECKMAN, JR. ENTITLED "TRANSMITTAL AT SUPERFUND REMOVAL PROCEDURES - REVISION 2," DATED 8/20/84.

13) "PROPOSAL OF UPDATE 1," FEDERAL REGISTER, DATED 9/8/83.

14) COMMUNITY RELATIONS IN SUPERFUND: A HANDBOOK (INTERIM VERSION), DATED 9/83.

15) "PROPOSAL OF FIRST NATIONAL PRIORITY LIST," FEDERAL REGISTER, DATED 12/30/82.

16) "EXPANDED ELIGIBILITY LIST," FEDERAL REGISTER, DATED 7/23/82.

17) "INTERIM PRIORITIES LIST," FEDERAL REGISTER, DATED 10/23/81.

18) UNCONTROLLED HAZARDOUS WASTE SITE RANKING SYSTEM: A USER'S MANUAL (UNDATED).

19) FIELD STANDARD OPERATING PROCEDURES - AIR SURVEILLANCE (UNDATED).

20) FIELD STANDARD OPERATING PROCEDURES - SITE SAFETY PLAN (UNDATED).

L.A. CLARKE RI/FS SELECTED SOIL AND SEDIMENT SAMPLE RESULTS

| LOCATION | DEPTH (FT) | TPNA (MG/KG) |
|---|---|---|
| TP-17 | 4 | 3,390 |
| 18 | 5 | 739 |
| 13 | 1 | 3,686 |
| 6 | 1 | 19,260 |
| " | 4.5 | 264,984 |
| 7 | 0.5 | 701 |
| 33 | 0.25 | 4,422 |
| 22 | 4.5 | 3,262 |
| 23 | 1.5 | 8,183 |
| SP-03 | 0.5 | 817 |
| 46 | 0.5 | 6,880 |
| 07 | 1.0 | 784 |
| 43 | 0.25 | 4,604 |
| 44 | 0.25 | 7,120 |
| 27 | 0.25 | 4,031 |
| 18 | 0.25 | 14,267 |
| 47 | 0.25 | 3,630 |
| 48 | 0.25 | 4,883 |
| 50 | 0.25 | 2,493 |
| VC-01 | 0.5 | 2,912 |
| | 1.5 | 54,034 |
| | 3.5 | 4,295 |
| TB-12 | 5.5 | 4,231 |
| | 11.5 | 38,790 |
| D11 | 0.25 | 1,481 |
| D12 | 0.25 | 1,480 |
| MO2 | 0.25 | 11,140 |

NOTES: 1) SEE FIGURES FOR SAMPLE LOCATIONS
2) TPNA (TOTAL POLYNUCLEAR AROMATIC) CONCENTRATIONS WERE IDENTIFIED EITHER VIA ANALYSIS BY AN EPA CONTRACTED LABORATORY OR VIA ULTRAVIOLET FLUORESCENCE SCREENING TECHNIQUE IN THE FIELD (SEE RI/FS FOR INFORMATION REGARDING THESE ANALYSES).